REPORTS BY THE
COMMISSIONER OF PUBLIC WORKS AND
CIVIL SERVICE COMMISSION
CITY OF CHICAGO---1913
BUREAU OF STREETS INVESTIGATION

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Reports on the Bureau of Streets Department of Public Works City of Chicago

Investigations conducted at the order of the City Council and at the request of the Commissioner of Public Works, April 21, 1913—October 15, 1913.

Methods, Systems, Standards and Schedules of Service—Bases of Estimates and Appropriations—Administrative Questions, Organization of the Bureau of Streets and of other Departments having similar activities.

L. E. McGANN
Commissioner of Public Works

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JOHN J. FLYNN
ELTON LOWER
Members, Civil Service Commission
City of Chicago

EFFICIENCY DIVISION
CIVIL SERVICE COMMISSION
JAMES MILES
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ALLIED PRINTING TRADES UNION LABEL COUNCIL CHICAGO 20

H. G. Adair, 107-111 North Market Street

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INVESTIGATION OF BUREAU OF STREETS DEPARTMENT OF PUBLIC WORKS

October 13, 1913.

TO THE HONORABLE CARTER H. HARRISON, MAYOR,
AND THE HONORABLE, THE CITY COUNCIL
OF THE CITY OF CHICAGO.

Gentlemen:

Following is a report of the Commissioner of Public Works and the Efficiency Division of the Civil Service Commission on the investigation of the collection of pure garbage, ashes, refuse and miscellaneous waste and of other activities of the Bureau of Streets, including their relationship to the other bureaus of the Department of Public Works and other departments of the city government.

Early in 1912 the Committee on Finance of the City Council requested the Efficiency Division of the Civil Service Commission to make a study and to report to it and to the Special Commission Regarding Ward Appropriations on a uniform, scientific plan for the distribution of appropriations for street and alley cleaning, the collection and removal of garbage, ashes, refuse and other city wastes, the repair and maintenance of streets and alleys and emergency needs of the Bureau of Streets of the Department of Public Works. In accordance with this request, the Civil Service Commission, under date of November 15, 1912, made a report to the Finance Committee and the Special Commission Regarding Ward Appropriations in which was included a scientific plan, with percentage basis, for the distribution of moneys for the activities above outlined. This percentage plan was adopted by the City Council upon the approval of the Department of Public Works, and was made the basis for the Bureau of Streets' ward appropriations in the annual appropriation ordinance passed January 2, 1913.

In order that the plan as outlined in that report be applied practically and efficiently the Commissioner of Public Works, early in 1913, requested the co-operation of the Civil Service Commission in assisting in the installation of the standards and uniform schedules upon which the appropriations as made in the 1913 city budget were based. The shortage in the city revenues, occasioned by the Illinois Supreme Court's interpretation of the Juul law late in 1912, prevented, to a certain extent, the complete installation of these schedules, but the officials of the Department of Public Works and the Efficiency Division of the Civil Service Commission, continued the studies on the problems involved during February, March and April, 1913.

REQUEST FOR INVESTIGATION.

On April 21, 1913, your honorable body passed the following order:

> "Ordered: That the Commissioner of Public Works be and he is hereby directed to make a thorough investigation in conjunction with the efficiency division of the Civil Service Commission and report to this Council on a comprehensive and scientific method of the collection of garbage, ashes and miscellaneous waste, together with recommendations in the premises."

Pursuant to this order, the Commissioner of Public Works directed the following communication to the Civil Service Commission on May 3, 1913:

The Honorable, the Civil Service Commission.

Gentlemen: In pursuance of the conference of recent date regarding

the order of the City Council directing the Commissioner of Public Works, in conjunction with the Efficiency Division of the Civil Service Commission, to make a thorough investigation and report to the Council of a comprehensive and scientific method for the collection of garbage, ashes and miscellaneous waste, I request the co-operation of the Commission in this regard and the assignment to the work of such members of the Efficiency Division as are available.

At this time, in view of the fact that the Efficiency Division has been at work in the Bureau of Streets since last July, and is now at work therein, I would suggest that the work comprehend all of the activities of the Bureau of Streets, including their relationship to the activities of the other bureaus of the department and other departments of the city government.

This latter suggestion is made in order that the Council request may be better complied with and the Bureau of Streets receive the benefit of a complete study of its needs.

It is also important at this time to take up the expenditure of ward appropriations adopted by the City Council, based upon the report of your Commission, and to give consideration to the Efficiency Division's recommendations regarding the distribution of the wheel tax fund.

To assure immediate benefits to the city as a result of these investigations, I desire that where individual inefficiency is shown, specifications be prepared for the signature of the head of the bureau and the signature of the commissioner, to be transmitted, so that the inefficient and neglectful employes may be separated from the service. Where changes of method are desired and recommended by your investigators, that may be put into operation within the appropriation limitation, the investigator making such recommendation will immediately formulate the proper order for approval, and on its being executed, see that it is put into operation to secure the effect desired by the change.

I particularly desire that the last two suggestions be put into effect, so that we may secure the immediate benefit of the investigation or determine the impracticability of the recommendation, due either to financial limitation or to a mistake in judgment.

Yours very truly,

(Signed) L. E. McGANN,
Commissioner of Public Works.

In answer thereto the Civil Service Commission transmitted the following on May 7, 1913:

Hon. Lawrence E. McGann,
Commissioner of Public Works,
City of Chicago.

Dear Sir: The Commission is in receipt of your letter of the 3rd instant, in which you request that the Efficiency Division of this Commission conduct, in conjunction with the Commissioner of Public Works, a thorough investigation and report to the City Council on a comprehensive and scientific plan for the collection of pure garbage, ashes, refuse and miscellaneous waste, and of other activities of the Bureau of Streets, including their relationship to the other bureaus of the Department of Public Works and other departments of the city government. In reply thereto the Commission has directed its Efficiency Division to take up the above work.

In this study, as in other work undertaken by the division, it will be the purpose to ascertain defects or faults in present methods, systems and conditions, and in so far as it is possible have the same remedied and corrected as the work proceeds. The work will be broadly conducted along the following general heads:

1. Ascertaining the methods and systems in use under existing conditions; verifying and examining records of work, men and equipment.
2. Suggesting changes in methods, systems and organization where deemed advisable.
3. Working in co-operation with departmental officials in installing effective methods, systems and organization.

The Commission will from time to time report any constructive

remedies which it may believe will result in increasing the efficiency of men, methods, equipment and work, as may be put into effect under existing conditions as to organization, equipment and city ordinances. It will also report on the existing efficiency of officers, employes, methods and equipment. Findings and conclusions will also be submitted which might be adopted if changes were made in the city ordinances and additional needed equipment secured.

The scope of the inquiry will be as broad as possible and cover all the details connected with each activity of the Bureau of Streets. This work will be under the supervision of the present Efficiency Division staff, and all the details covered as the Commission is able to place men qualified to render efficient and constructive work.

Yours very truly,

CIVIL SERVICE COMMISSION,

(Signed) ELTON LOWER,
Commissioner.

SCOPE OF PRESENT INVESTIGATION.

The Civil Service Commission accordingly directed its Efficiency Division to take up the work where it had left off in the previous study, and, in co-operation with the Department of Public Works, proceed to complete the study for a comprehensive and scientific plan in the cleaning and repair of streets and alleys, the collection and removal of pure garbage, ashes, refuse and miscellaneous waste, and of other activities of the Bureau of Streets, including their relationship to the other bureaus of the Department of Public Works and other departments of the city government.

The inquiry upon which this report is based has been conducted on a plan which provided for an analysis of the underlying general principles, and the submission of findings and recommendations based on this analysis.

In the course of the study and investigation of matters included in the order passed by your honorable body on April 21, 1913, information and data have been collected on matters included in the letter of the Commissioner of Public Works to the Civil Service Commission on May 3, 1913, which is shown herein. This information and the recommendations have been incorporated in a separate report to the Commissioner of Public Works, copy of which report is attached hereto as Appendix "A."

Summary of the recommendations which may be put into effect immediately without change in the existing organization of the Bureau of Streets or city ordinances is given at the end of this report. Such recommendations as may be put into effect only after certain changes and additions to the present city ordinances and changes in the organization of the Bureau of Streets are included in the report transmitted to the Commissioner of Public Works above referred to.

The matters which have been considered and the findings and recommendations included in these reports are as follows:

1. Cleaning of streets and alleys, and removal of street dirt and special snow removal.
2. Collection and removal of garbage.
3. Collection and disposal of ashes and rubbish.
4. Distribution of wheel tax fund for repair of streets and alleys.
5. Construction of sidewalk intersections and the care of sidewalks, unimproved streets and alleys and other emergency needs.
6. Administrative problems, equipment, general conditions, systems and records in the bureau and ward offices.

METHODS PURSUED.

The procedure adhered to throughout this study has been as follows:

(1) Ascertaining administrative problems, organization and equipment, conditions, methods and systems employed and results obtained.

(2) Applying underlying and attainable standards and determining the extent and relative virtues and defects of existing administration, organization, equipment, methods and systems.

(3) Providing constructive recommendations and co-operating with departmental officials in correcting ineffective and inequitable methods, etc., and to secure and maintain effective, sanitary and economic administration of these municipal functions.

The investigation of the matters above referred to has been pursued under the following methods:

(1) By research and analysis of all bibliographical, statistical and general information and data appearing in publications of scientific and public institutions and given by experts on these subjects.

(2) Through the medium of written inquiries directed to private and public officials and larger municipalities in this country and Europe.

(3) By personal inquiry made by the technical staff and the special corps of investigators and examiners.

INFORMATION ON HAND.

At the beginning of this investigation considerable data and information were available which had been collected during the ward appropriation investigation, report of which was submitted to the City Council on Nov. 15, 1912. This made it possible to begin constructive work without the delay and expense which is usually necessary with no preceding or preliminary study.

An idea of the information and data on hand is given in the following:

1. Reports and records of methods employed and schedules and standards maintained in different wards of the city for street and alley cleaning, collection and removal of street dirt, ashes, and rubbish and pure garbage and street repair work.
2. Record of the methods and systems in use in other municipalities in administering the activities cared for by the Bureau of Streets, obtained by personal and written inquiries and by analysis of literature on these subjects.
3. Digests of literature and bibliography concerning street and alley cleaning and repair and garbage and refuse collection.
4. Records of the activities of the different bureaus within the Department of Public Works and other city departments, and the distribution of work where the functions performed by these bureaus and departments of the city are of a similar character.
5. Records of the moneys appropriated and expended during each of the years from 1905 to 1912, inclusive, and the comparative cost and amount of service given in return for such expenditure, as shown in Tables I, IV and V.
6. Record of the kind and area and age of pavements in every paved street and alley in the city.
7. Record of the physical condition of all pavements, character and density of traffic, frontage of streets, size and location of churches and public buildings and institutions, such as schools, parks, etc., subways, the character and percentage of residence, business and manufacturing population and the traffic at about 500 points in all wards of the city.
8. Maps of the 35 wards of Chicago, showing the pavement of the various streets of the wards, and the area of each kind of pavement, also showing location of boulevards, street car lines, etc.
9. Record and bases of uniform standards of street and alley cleaning upon which the estimates for ward appropriations for 1913 were prepared by the Efficiency Division.
10. Records of the tendencies of population and improvements in each section of the city, the variation in the collection of garbage, refuse and other waste in different parts of the city due to seasonable changes, and of the work done and results obtained by the Bureau of Streets.
11. Reports to the number of about 320 on the general physical condition of garbage and refuse service in different sections of the city during the first four months of the year 1913.
12. Data upon which a standard is determined for a day's work for a laborer on different kinds of pavement; for a garbage, refuse and

TABLE I — BUDGET APPROPRIATIONS & ACTUAL EXPENDITURES 1905–1912 BUREAU of STREETS — DEPT. of PUBLIC WORKS

NEW WARDS 1912

WARD	Street Alley Cleaning 202 A & B	Refuse & Ash Removal 205 A & B	Garbage Removal 204 A & B	Emergency Fund 205 A-B & D	WARD TOTALS	% of Total Ward Approp.
1	194,450	42,950	8,400	1,400	958,200	14.52
2	43,600	32,147	13,643	326	89,715	3.62
3	23,500	27,100	14,500	175	65,275	2.65
4	23,375	23,050	13,760	75	60,250	2.45
5	26,950	17,300	9,600	1,950	54,800	2.23
6	21,850	20,900	12,900	50	55,700	2.26
7	21,900	30,500	12,600	700	65,700	2.67
8	17,550	22,200	No Separation	6,950	46,700	1.89
9	16,500	22,500	No Separation	5,000	44,000	1.79
10	25,850	19,700	9,550	200	55,300	2.25
11	22,900	18,800	8,550	400	50,650	2.05
12	26,737	17,306	8,112	3,845	55,000	2.23
13	24,000	27,600	16,050	575	68,225	2.77
14	20,825	27,300	12,450	200	60,775	2.47
15	26,400	25,800	13,025	275	65,500	2.66
16	24,000	19,500	12,375	125	56,000	2.27
17	26,000	24,100	11,750	155	62,005	2.52
18	61,500	38,250	14,300	250	130,640	5.28
19	25,950	27,200	10,500	115	63,766	2.57
20	27,475	24,300	12,350	65	64,790	2.62
21	45,850	43,500	10,850	150	105,150	4.24
22	27,639	27,600	8,900	85	64,215	2.60
23	25,400	32,250	11,600	750	70,000	2.84
24	80,660	23,950	11,750	650	67,000	2.32
25	13,050	21,500	17,250	535	52,335	2.13
26	23,100	24,000	14,100	800	62,000	2.52
27	18,950	15,100	12,060	5,900	52,000	2.11
28	22,175	20,700	11,900	225	55,000	2.23
29	15,225	16,700	6,825	6,250	45,000	1.83
30	16,825	23,500	14,575	100	55,000	2.23
31	19,600	24,300	15,800	300	60,000	2.44
32	20,050	25,700	12,700	2,200	60,650	2.46
33	18,200	21,150	11,350	1,300	52,000	2.11
34	16,500	19,600	14,450	1,450	52,000	2.11
35	12,350	21,500	14,850	1,300	50,000	2.03
1) Total Initial Appropriation					2,465,340	100
2) Total Expenditure by Wards						
3) Appropr'n-Supervn & Office-Gen'l					250,211	
4) Appropr'n - Const'n & Betterments					270,500	
5) Appropriation - General					1,269,017	
6) Total Initial Appropr'n (Items 1-3-4-5)					4,255,068	
7) Grand Total Expenditures						

OLD WARDS 1911

WARD	Fuel 201 E	Services, Refunds, etc 201 S	St. and Alley Cleaning, Labor 202 A	Street & Alley Cleaning, Teams & Wagons 202 B	Gen'l Supplies 202 C	Apparatus, Machinery 202 F	Refuse & Ash Removal, Labor 203 A	Refuse & Ash Removal, Teams & Wagons 203 B	Garbage Removal, Labor 204 A	Garbage Removal, Teams 204 B	Emergency Fund, Labor 205 A	Emergency Fund, Teams 205 B	Repairs 205 D	WARD TOTALS	% of Total Ward Approp
1	300	1,000	130,000	48,000	4,000		3,000	20,600	860	1,725	600	400	200	296,685	12.85
	162	262	127,033	40,555	5,718		4,240	21,282	620	1,705	545	351	396	285,268	
2	43,600	32,147	13,643	326	89,715	3.62	25	150	24,000	6,600	400	250	2,500	22,000	1600	8600	50	50	25	66,250	2.87
							15	56	23,997	6,594	259		2,483	22,132	1,600	8,366	50	99	47	65,698	
3	23,500	27,100	14,500	175	65,275	2.65	20	150	20,200	5,900	400	100	2,500	23,000	1,600	8,600	50	50	50	62,595	2.72
							13	51	20,514	5,837	243	27	2,399	22,457	2,050	8,327	50	47	16	62,031	
4	23,375	23,050	13,760	75	60,250	2.45	40	150	16,700	2,400	300	100	2,450	14,200	2,680	7,900	50	200	25	47,195	2.05
							28	118	18,094	1,531	299	109	2,650	14,394	2,178	6,999		50	4	46,454	
5	26,950	17,300	9,600	1,950	54,800	2.23	40	150	15,700	2,500	300	100	2,500	12,500	2,800	7,300	400	500	75	44,865	1.95
							27	109	17,924	1,836	225		2,500	11,305	2,325	7,359	250	349	339	44,548	
6	21,850	20,900	12,900	50	55,700	2.26	50	150	19,800	5,200	500	100	3,500	29,000	4,000	15,500	50	100	25	77,975	3.38
							34	109	21,135	4,697	347	80	2,944	29,126	3,311	13,596	38	50		75,467	
7	21,900	30,500	12,600	700	65,700	2.67	50	150	21,000	6,400	700	100	3,000	27,000	3,500	15,500	225	275	50	77,950	3.38
							42	113	21,895	6,380	302	53	3,300	26,076	3,499	15,700	175	223	24	77,782	
8	17,550	22,200	No Separation	6,950	46,700	1.89	40	150	11,000	2,700	250	60	4,200	14,000	No Separation		4,300	3,000	950	40,650	1.74
							37	101	11,907	1,942	243	41	4,193	14,938			2,792	3,455	647	40,296	
9	16,500	22,500	No Separation	5,000	44,000	1.79	40	150	15,300	6,400	400	100	3,400	11,500	2,725	6,900	25	50	25	47,015	2.04
							22	126	15,725	3,625	375	77	3,343	13,991	2,278	6,947	10		6	46,522	
10	25,850	19,700	9,550	200	55,300	2.25	40	150	17,000	5,700	300	150	3,400	11,350	2,200	5,550	125	75	25	46,065	2.00
							33	54	17,201	3,351	286	16	3,400	13,432	2,115	5,665	91	48	21	45,713	
11	22,900	18,800	8,550	400	50,650	2.05	40	150	17,000	5,000	300	150	3,200	11,350	2,200	6,900	300	400	25	47,015	2.04
							26	47	17,752	3,449	259	40	2,300	13,742	2,200	6,619	25	324	23	46,806	
12	26,737	17,306	8,112	3,845	55,000	2.23	40	150	17,800	4,000	400	200	4,000	19,200	3,200	9,000	400	1000	250	59,640	2.59
							49	109	20,200	2,863	362	40	4,229	18,934	1,843	8,349	294	1,318	231	58,821	
13	24,000	27,600	16,050	575	68,225	2.77	40	150	18,100	5,400	400	100	2,800	18,500	2,700	13,000	150	250	75	61,665	2.68
							42	104	18,225	4,057	286	142	2,971	20,176	2,700	12,348	150	245	34	61,480	
14	20,825	27,300	12,450	200	60,775	2.47	40	150	15,500	5,000	300	100	2,800	19,400	3,700	8,500	25	50	25	55,590	2.43
							31	97	15,700	5,207	252	27	3,383	19,916	3,600	7,499	24	50	15	54,905	
15	26,400	25,800	13,025	275	65,500	2.66	40	150	17,600	4,500	300	100	2,600	19,200	3,600	8,500	50	50	50	56,740	2.46
							27	109	18,445	4,464	164	69	2,600	19,165	2,554	8,495	50	50	19	56,211	
16	24,000	19,500	12,375	125	56,000	2.27	40	150	15,600	5,800	300	100	2,800	17,800	3,700	8,500	50	50	25	54,915	2.39
							33	104	17,384	5,957	222	29	2,849	16,302	3,560	7,744	49	50	3	54,286	
17	26,000	24,100	11,750	155	62,005	2.52	40	150	14,400	10,000	450	300	2,000	23,200	3,850	6,900	50	50	100	61,490	2.67
							33	94	14,128	9,925	439	27	1,897	21,500	3,555	7,417	27	48	41	59,131	
18	61,500	38,250	14,300	250	130,640	5.28	50	150	29,200	15,800	1,000	300	2,000	12,200	2,000	3,500	100	50	100	75,650	3.28
							66	120	34,722	10,647	724	27	2,547	11,762	1,453	4,180	49	46	59	74,764	
19	25,950	27,200	10,500	115	63,766	2.57	40	150	18,740	9,400	500	200	3,000	19,200	2,600	5,800	100	50	75	59,855	2.61
							35	130	19,687	5,922	493	53	3,900	21,542	2,100	6,182	45	7		60,096	
20	27,475	24,300	12,350	65	64,790	2.62	40	150	14,500	6,600	400	200	3,800	27,100	3,500	10,300	50	50	25	66,715	2.90
							35	102	15,027	3,951	159	13	3,637	30,844	3,857	10,565	1	31		68,222	
21	45,850	43,500	10,850	150	105,150	4.24	40	150	20,000	8,200	600	300	1360	30,760	3 300	5,100	75	50	25	74,960	3.26
							39	94	22,190	8,417	542	13	1601	31,345	2,634	5,203			23	73,400	
22	27,639	27,600	8,900	85	64,215	2.60	40	150	19,200	9,200	500	300	2700	25,500	3,000	3,400	100	50	25	64,165	2.78
							40	120	23,789	8,099	402	24	2420	23,400	2,450	4,312	39	13	17	65,125	
23	25,400	32,250	11,600	750	70,000	2.84	40	150	13,000	5,500	300	300	2,000	20,000	3,200	9,000	100	500	25	54,115	2.35
							32	106	13,395	5,497	207	27	2,660	21,390	2 049	7 920	248	421	16	53,968	
24	80,660	23,950	11,750	650	67,000	2.32	40	150	14,000	5,400	300	200	2,800	17,500	2,800	9,400	150	200	25	52,965	2.30
							33	108	15,139	4,926	202	40	2,795	19,033	1,149	8,448	124	322	132	52,451	
25	13,050	21,500	17,250	535	52,335	2.13	40	150	14,900	5,400	400	650	4,300	36,000	2,000	23,500	100	250	50	87,740	3 81
							33	130	18,141	5,631	310	141	4,368	34,744	1,739	21,797	110	275		87,419	
26	23,100	24,000	14,100	800	62,000	2.52	40	150	15,700	6,000	400	250	2,000	31,000	2,000	15,500	100	200	300	73,640	3 20
							51	109	17,552	6,254	254	53	3,290	27,005	3,931	13,599	190	349	248	72,885	
27	18,950	15,100	12,060	5,900	52,000	2.11	40	150	21,600	3,000	300	200	2,300	19,000	3,000	9,400	2,000	3,200	1000	65,190	2.83
							27	98	20,000	3,747	250		2,600	19,476	2,100	10,214	3,000	2,566	1,797	64,875	
28	22,175	20,700	11,900	225	55,000	2.23	40	150	15,200	4,000	300	200	2,000	19,800	2,500	11,000	100	300	25	55,615	2 42
							26	113	16,363	3,607	268	40	2,170	19,861	1,700	11,365	77	129	15	55,854	
29	15,225	16,700	6,825	6,250	45,000	1.83	40	150	10,200	4,000	300	200	2,500	15,800	2,800	7,500	1,000	1,800	500	46,790	2.03
							34	96	12,188	2,518	196	53	2,500	16,448	3,025	6,999	1,100	967	500	46,624	
30	16,825	23,500	14,575	100	55,000	2.23	40	150	15,800	3,300	300	150	2,700	19,000	2,800	7,500	75	50	100	51,965	2.26
							36	100	15,799	3,266	380	141	2,474	19,055	2,451	7,854	27	19	42	51,638	
31	19,600	24,300	15,800	300	60,000	244	40	150	12,000	3,500	300	200	3,200	22,500	3,200	12,000	600	800	400	58,890	2.56
							13	105	13,962	3,172	277	126	3,196	19,891	3,199	12,408	688	949	442	58,378	
32	20,050	25,700	12,700	2,200	60,650	246	40	150	12,400	2,900	300	150	2,500	25,800	3,000	12,000	500	800	300	60,840	2 64
							28	95	15,961	4,011	184	50	2 638	24,684	2,903	11,187	500	946	296	53,483	
33	18,200	21,150	11,350	1,300	52,000	2,11		150	15,000	2,500	300	200	4,000	25,000	No Separation		900	1000	600	49,650	2.16
								112	14,505	3,219	225		3 898	23,469			1,143	1,541	530	48,642	
34	16,500	19,600	14,450	1,450	52,000	2.11	40	150	12,460	3,000	300	200	3,800	15,000	3,000	12,000	300	600	100	50,950	2.22
							36	94	12,596	3,119	121		3,968	16,222	2,753	10,541	320	826	68	50,664	
35	12,350	21,500	14,850	1,300	50,000	2.03	40	150	10,200	2,000	300	200	2,700	20,000	3,000	8,600	800	900	150	49,040	2.13
							34	94	10,208	1,228	155	80	3,169	20,895	2,880	8,421	850	490	188	48,692	
1) Total Initial Appropriation																				2,303,025	100
2) Total Expenditure by Wards																				2,268,599	
3) Appropriation - Supervision & Office - Gen'l																				243,166	
4) Appropriation - Const'n & Betterments																				32,650	
5) Appropriation - General																				1,064,182	
6) Total Initial Appropriation (Items 1-3-4-5)																				3,643,023	
7) Grand Total Expenditures																				3,578,515	

1910

WARD	Street Alley Cleaning, Labor 203 A	Street & Alley Cleaning, Teams & Wagons 203 B	Gen'l Supplies 203 C	Garbage, Rubish & Ash Removal, Labor 204 A	Garbage, Rubish & Ash Removal, Teams & Wagons 204 B	Emergency Fund, Labor 205 A	Emergency Fund, Teams 205 B	Repairs 205 D	Gen'l Supplies 202 C, Water 202 E	WARD TOTALS	% of Total Ward Approp
1	118,500	42,400	4,000	5,000	24,750	900	800	400	1050	259,800	12.29
	134,400	52,578	3,976	5,846	23,098	1,112	956	310	984	285,988	
2	19,600	5,000	700	3,750	30,000	300	300	190	650	60,490	2.85
	20,405	6,109	698	3,640	29,000	10	15	20	282	60,179	
3	19,000	4,500	500	3,750	30,000	350	350	140	650	59,240	2.80
	19,515	5,544	556	3,929	29,715	1	3	26	327	59,616	
4	16,300	2,000	500	5,500	18,250	325	325	150	550	44,000	2.07
	16,396	1,627	463	4,895	18,950	25	188		325	42,842	
5	12,000	3,600	400	5,000	15,750	1,500	1,500	600	650	41,000	1.94
	15,329	2,396	500	3,808	17,114	677	446	99	391	40,760	
6	18,000	5,800	700	6,000	42,450	320	320	100	650	74,340	3.51
	20,952	4,721	618	4,897	41,896	60	89		392	73,625	
7	20,000	5,500	900	7,500	39,250	400	400	140	650	74,740	3.53
	20,300	6,485	783	7,381	38,232	205	225	104	384	74,099	
8	13,000	3,600	400	4,500	13,250	1750	1750	1030	650	39,930	1.89
	10,299	2,700	365	4,125	14,800	2 883	3,085	770	486	39,513	
9	13,900	6,000	400	3,750	21,500	325	325	150	650	47,000	2.23
	14,532	6,305	368	3,629	22,304	17	11		269	47,435	
10	15,000	6,200	400	2,500	20,250	800	800	400	650	47,000	2.23
	17,624	5,950	623	2,753	18,974	150	50		371	46,501	
11	14,800	5,000	400	3,000	20,250	800	800	400	650	46,100	2.18
	14,198	4,499	478	2,997	21,625	499	799	247	323	45,665	
12	14,500	3,300	500	6,500	19,250	850	850	500	650	46,900	2.22
	16,340	2,400	350	4,010	21,762	420	849	226	334	46,691	
13	16,600	5,000	400	4,000	29,250	475	475	250	650	57,100	2.70
	17,800	4,863	397	4,000	30,470	125	273		425	58,353	
14	13,500	4,500	400	7,000	23,250	350	350	190	650	50,190	2.37
	15,150	3,800	548	6,550	24,498	26	22		307	50,901	
15	16,900	4,000	400	3,750	24,500	350	350	200	650	51,100	2.41
	17,588	4,288	315	4,350	23,872	10	73		356	50,912	
16	16,800	8,000	500	4,750	21,000	350	350	200	650	52,600	2.48
	15,300	5,990	390	6,028	23,945	97		22	414	51,286	
17	13,000	8,200	400	4,250	27,500	400	400	200	650	55,000	2.61
	12,795	8,997	321	4,020	27,892	43	48		305	54,421	
18	21,000	20,000	600	2,250	19,500	400	400	200	650	69,200	3.27
	30,750	14,364	843	2,675	19,226	60	38		323	71,381	
19	16,000	8,000	600	4,750	29,000	325	325	140	650	59,790	2.83
	16,399	8,833	636	4,750	29,000	102	44	56	317	60,137	
20	9,300	7,700	400	6,500	41,250	350	350	190	650	66,690	3.16
	13,724	4,737	466	7,100	40,050	46			292	60,415	
21	17,350	8,000	650	4,200	34,650	400	400	165	650	66,465	3.15
	20,024	7,690	728	4,069	35,343	84	3	25	384	68,350	
22	15,750	9,250	600	4,750	28,000	400	400	200	650	60,000	2.84
	19,630	9,046	564	4,733	26,136	155	49		349	60,662	
23	12,000	5,500	400	5,000	26,750	375	375	190	650	51,240	2.43
	12,628	5,048	418	4,493	27,449	186	496	6	430	51,154	
24	12,000	5,200	400	6,250	22,500	500	500	240	650	48,240	2.29
	13,000	4,816	300	3,725	25,007	246	230	2	316	47,642	
25	11,000	5,200	400	11,000	50,750	500	500	240	650	80,240	3.80
	13,511	5,176	330	8,318	51,275	180	251		274	79,315	
26	14,200	6,000	400	5,750	38,000	800	800	400	650	67,000	3.18
	16,039	6,183	497	3,696	40,732	115	209		411	67,882	
27	19,300	4,000	400	4,000	21,750	2,500	2,500	1000	650	56,100	2.66
	19,300	1,998	367	3,000	25,043	1,700	2,999	807	295	55,509	
28	13,200	6,000	400	5,000	23,750	400	400	200	650	50,000	2.37
	14,461	3,741	398	3,990	26,654	96	286	16	282	49,924	
29	11,000	5,300	400	3,750	19,000	1,600	1,600	800	650	44,100	2.09
	10,320	3,950	391	3,662	21,529	1,314	1,368	568	429	43,521	
30	13,200	2,000	400	4,850	24,000	2,000	2,000	1,000	650	50,100	2.37
	15,520	3,287	434	4,653	26,041	86	44	6	340	50,411	
31	11,000	3,250	350	6,250	27,500	400	400	200	650	50,000	2.36
	10,300	3,249	356	5,788	29,188	630	629	255	374	50,769	
32	12,600	3,000	400	4,250	31,500	625	625	350	650	54,000	2.56
	11,893	2,374	306	4,736	32,306	523	823	253	447	53,661	
33	14,000	2,300	400	3,250	19,500	1,600	1,600	800	650	44,100	2.09
	14,050	2,496	411	3,625	20,222	898	924	678	368	43,672	
34	11,000	3,600	400	6,500	22,250	625	625	350	650	46,000	2.18
	11,028	1,923	361	6,725	25,260	259	525	83	260	46,424	
35	9,500	2,750	350	6,000	22,250	1,800	800	400	650	43,500	2.06
	9,609	1,450	236	6,200	25,650	733	863	351	339	45,431	
1) Total Initial Appropriation										2113,295	100
2) Total Expenditure by Wards										2,148,424	
3) Appropriation - Supervision & Office - Gen'l										185,693	
4) Appropriation - Const'n & Betterments										18,400	
5) Appropriation - General										763,550	
6) Total Initial Appropriation (Items 1-3-4-5)										3,080,928	
7) Grand Total Expenditures										3,170,969	

1909

WARD	WARD TOTALS	% of Total Ward Approp
1	286,000	13.60
	288,892	
2	60,490	2.87
	60,479	
3	59,240	2.83
	59,054	
4	39,900	1.00
	39,871	
5	39,900	1.90
	39,742	
6	75,240	3.57
	74,420	
7	74,740	3.55
	74,646	
8	39,930	1 90
	39,054	
9	44,600	2.12
	44,538	
10	44,600	2.12
	44,443	
11	44,600	2.12
	44,588	
12	44,600	2.12
	43,535	
13	57,040	2 72
	56,982	
14	48,590	2.32
	48 115	
15	49,715	2 36
	48 784	
16	49,590	2 36
	49,590	2 33
17	53,990	2 56
	53 342	
18	64,590	3 07
	64 484	
19	58,790	2 79
	58,247	
20	66,690	3 16
	66,654	
21	67,365	3 21
	67,350	
22	59,240	2 81
	59,025	
23	51,140	243
	51,137	
24	48,240	2 29
	47,080	
25	78,240	3 72
	77,763	
26	69,240	3 25
	69,901	
27	61,640	2 89
	56,574	
28	48,890	2 32
	48,882	
29	43,740	2 08
	43,624	
30	48,890	2 28
	48,483	
31	51,440	2 41
	46,847	
32	54,490	2 55
	43,535	
33	46,740	2 19
	44 185	
34	46,740	2 19
	44,178	
35	44,990	2 10
	41,987	

1908

WARD	WARD TOTALS	% of Total Ward Approp
1	286,000	13.40
	288,892	
2	60,490	2 83
	60,490	
3	59,240	2 78
	59,238	
4	39,990	1 87
	39,957	
5	42,490	1 99
	39,787	
6	75,240	3 53
	71,838	
7	74,740	3.50
	74,662	
8	42,930	2.02
	39,054	
9	44,600	2 09
	44,473	
10	44,600	2 09
	44,600	
11	44,600	2 09
	44,586	
12	44,600	2 09
	43,535	
13	57,040	2 68
	56,786	
14	48,590	2 28
	48,115	
15	49,715	2 33
	48,784	
16	49,590	2 33
	49,590	2 33
17	53,990	2 53
	53,342	
18	64,590	3 03
	64,484	
19	58,790	2 75
	58,754	
20	66,690	3 13
	66,654	
21	67,365	3 15
	67,350	
22	59,240	2 78
	59,025	
23	51,140	240
	51,137	
24	48,240	2 26
	47,080	
25	79,240	3 72
	79,787	
26	69,240	3 25
	69,901	
27	61,640	2 89
	56,574	
28	48,890	2 28
	48,882	
29	47,240	2 21
	43,624	
30	48,890	2 28
	48,483	
31	51,440	2 41
	46,847	
32	54,490	2 55
	43,535	
33	46,740	2 19
	44 185	
34	46,740	2 19
	44,178	
35	44,990	2 10
	41,987	

1907

WARD	WARD TOTALS	% of Total Ward Approp
1	240,000	13.73
	272,216	
2	50,000	2 86
	57,194	
3	50,000	2 86
	56,854	
4	35,000	2 00
	39,462	
5	37,500	2 14
	39,878

rubbish collector and formula for determining number of cleanings per week based upon traffic and miscellaneous conditions affecting cleaning.

13. Information and data concerning the location, character and life of dump sites, clay holes, etc., used by the city of Chicago.
14. Information concerning the operation of private scavengers in the city of Chicago.
15. Records and tabulation of the wheel tax collected by the city of Chicago, 1909 to 1912, inclusive, and plans for distribution of wheel tax fund, based upon the physical needs of streets.
16. Information and data regarding the cost of special snow removal.
17. Information and data concerning the amount of emergency repair work liable to require attention in the various wards of the city; tabulation of area of plank sidewalks in use, and data concerning the lineal feet of sidewalk intersections and curbs necessary to be built in 1913.
18. Information concerning the work done and moneys expended by private improvement associations in the city.

WORK OF TECHNICAL BOARD (STREETS).

As a further result of the order passed April 21 and conferences between the Commissioner of Public Works and his Bureau of Street staff on one hand, and the Civil Service Commission and the Efficiency Division staff on the other, a Technical Board (Streets) was appointed consisting of three members from the Bureau of Streets and three members of the staff of the Efficiency Division of the Civil Service Commission, as follows:

Representing the Department of Public Works:

WALTER G. LEININGER, Third Assistant Superintendent of Streets. (Appointed Superintendent of Streets October 1, 1913).

WILLIAM J. GALLIGAN, Second Assistant Superintendent of Streets.

THOMAS FITZPATRICK, Superintendent of Garbage Disposal.

Representing the Civil Service Commission:

JAMES MILES, Examiner in Charge, Efficiency Division.

J. L. JACOBS, Efficiency Engineer in Charge.

FRANK H. CENFIELD, Efficiency Engineer.

The objects sought in the appointment of the Technical Board (Streets) were:

1. Effective co-operation of the bureau in the installation of corrective measures.
2. Creation of an expert force to maintain such measures after the force of the Efficiency Division has been withdrawn.
3. Recognition of efficient expert service of men within departments.
4. Training of experts for future bureau and department heads, recognizing the fact that under the promotion system men qualified for this service ultimately rise to high positions in the service.
5. That in effect the plan as it is carried out from department to department will result in greatly increasing the available force for work of the Efficiency Division without increasing its staff payroll.

This board was appointed with power to act (1) in passing on the recommendations and measures brought out in the investigation into the methods, systems, and organization of the Bureau of Streets by the Efficiency Division; (2) to put into practical effect such recommendations which could be applied without the necessity for changes in appropriation and organization not available at the present time, and (3) to perfect the specifications and the purchase of new and modern equipment, the installation of uniform schedule for street cleaning and garbage and refuse collection and removal, the location of loading stations and platforms and such other matters as would lead ultimately to scientific and effective handling of all the activities of the Street Bureau.

In the course of the investigation, the Technical Board (Streets) reviewed and considered the following matters:

1. The establishment of uniform service for street and alley cleaning and garbage and refuse removal in all sections of the city, this service to be based upon scientific investigation of the needs and conditions as regards the district, traffic, pavements, character and tendency of growth of population, etc.
2. The organization of a division for the planning and inspection of all activities of the street bureau in the city under the Superintendent of Streets.
3. The establishment of a uniform system of accounts in the ward offices and in the central office, to make the results accomplished and unit costs of service comparable.
4. The feasibility of and practical results to be accomplished by the establishment of a corps of central office inspectors operating under the direction of the Superintendent of Streets to insure efficiency and uniform service throughout the city.
5. The necessary funds for these central office inspectors and planning division above mentioned.
6. The requirement of daily service reports from each section foreman to his superintendent.
7. The necessity of continually taking traffic census and the making of time studies as a check on changing conditions and the determination of a standard day's work required from each laborer engaged in the Bureau of Streets.
8. The ascertaining and recording of efficiency ratings of all employes, based upon the accomplishment of a standard day's work.
9. The uniforming of employes engaged in street cleaning and refuse collection and removal, to minimize danger of accidents and increase the efficiency and esprit de corps of field force.
10. The carrying on of experimental work in street cleaning and refuse collection to determine best methods of performing work, and the dissemination of this information by means of bulletins among the various divisions of the service, calling the attention of all employes to these improved methods.
11. The distribution of the wheel tax fund upon a more scientific basis, according to the physical needs of the pavements and the requirements of main traffic thoroughfares.
12. (a) The policy of having all extensive street repairs made under the immediate direction of the central office; (b) the creation of positions of foreman of granite and brick repairs similar to the present position of foreman of asphalt repairs, and the creation of a position of clerk in charge of records for the wheel tax division.
13. The prompt disposal of scrap material and old equipment to facilitate the operation of the bureau.
14. The preparation of ward maps showing the kind and condition of pavements in the city.
15. The co-ordination and co-operation between the various departments of the city government and the Bureau of Streets.
16. The compilation of pay-rolls of the different divisions in the Bureau of Streets, according to character of work done.
17. The improvement of present equipment and purchase of new and modern equipment for the Bureau of Streets.
18. The utilization of finger-print records as a definite method of identifying employes.
19. The extension in all wards of the system of destruction of combustible materials by portable incinerators.
20. The thorough regulation and inspection of private scavengers.
21. The placing of sole responsibility for the cleanliness of streets and sidewalks in public markets upon the ward superintendents in whose wards such markets exist.
22. The rigid enforcement of ordinances pertaining to manure boxes and vaults.

23. The amendment of section 995 of the City Code of 1910, to fix more definitely responsibility for the furnishing of refuse cans on owners of buildings.
24. The education of citizens to high standards of cleanliness and appreciation of responsibility for sanitary conditions by co-operative work with civic organizations, improvement associations and the public school system in the city.
25. The reconstruction of old and the construction of new loading stations for refuse and garbage.
26. The purchase of new sites for refuse loading stations.
27. The construction of refuse disposal and utilization stations for the destruction of combustible waste in congested districts of the city.
28. The reorganization and consolidation of bureaus within the Department of Public Works, and greater co-ordination between the city departments, which have similar activities and offices.
29. The strict supervision of laborers, section foremen and teamsters, and the assignment and retention of such employes only upon efficiency and seniority.
30. The provision of definite rules and regulations and instruction for employes governing the work and methods to be used in carrying on the street bureau activities.
31. The division of city into divisions and districts for the administration of the activities in the Bureau of Streets.

All of the recommendations hereinafter included have been reviewed, considered and approved by the Technical Board (Streets).

DATA FROM AMERICAN CITIES.

Inquiries directed to the larger cities of the country as to the methods and systems used in the cleaning and repair of streets and alleys and the collection of municipal wastes brought forward replies from twenty-five of the larger municipalities. The analysis of the information received showed the diversity of methods and conditions and a general lack of uniformity in maintaining uniform records and standards and it was found impossible to use the same as a basis for comparison. The information collected is, however, useful in indicating in what manner these problems are being treated in the different cities in this country. Table II includes the more important information collected on conditions, methods and systems in use in carrying on the above activities in the larger cities in this country.

CLEANING OF STREETS AND ALLEYS.

The methods and equipment used at present in the cleaning of streets and alleys in the city of Chicago vary with the character and condition of pavement, the location of the district and the amount of funds available for this purpose. The installation of definite and uniform schedules based upon the studies made during the past year will tend greatly to unify the methods and equipment used by street cleaners throughout the city.

At the present time street and alley cleaning work is done by any one of the following methods:

1. Cleaning by hand with broom and scraper.
2. Patrolling with a boulevard scraper.
3. Cleaning through gangs equipped with necessary tools.
4. Flushing with machine flushers.
5. Cleaning with machine sweepers.
6. Patrolling with paper incinerators.

The general method at present used in the various wards consists of the assignment of a laborer to a given section, which is cleaned by him by hand with broom and scraper under the block or patrol system. His work is inspected regularly by a foreman assigned to a given number of sections and by the superintendent of the ward as time

DATA FROM AMERICAN CITIES REGARDING STREET CLEANING, REFUSE COLLECTION AND REMOVAL AND STREET REPAIRS

STREET CLEANING

CITY	POPULATION	METHOD	NUMBER STREET SWEEPERS	CLEANING SEASON	PAVED ALLEYS HOW OFTEN CLEANED	HAND SWEEPING QUALITY OF WORK	HAND SWEEPING LABORERS EMPLOYED BY	HAND SWEEPING WAGES PER DAY	HAND SWEEPING KIND OF UNIFORMS	HAND SWEEPING LIFE OF UNIFORMS	HAND SWEEPING UNIFORMS FURNISHED BY	HAND SWEEPING UNIFORMS WASHED BY	TYPE OF FLUSHER USED	EQUIP. FOR COLLECTION OF DIRT	SEPARATION OF REFUSE	SUBURBS & ACRES COLLECTED BY	METHOD OF HAULING	METHOD OF UNLOADING	DISPOSITION	GARBAGE COLLECTION & REMOVAL COLLECTORS	METHOD OF HAULING	TYPE OF WAGON USED	KIND OF COVER	METHOD OF UNLOADING	DISPOSITION	NO. AUTO TRUCKS FOR REMOVAL OF WASTE
Canada	100,283	Day labor; contract & overed by cont.	42 hand brooms; 4 foremen; 4 sprinklers; 1 superintd't	9 months Mar 10 - Dec 15	Once in 2 weeks; oftener if necessary	Americans		$1.85 8-hrs	None				6 Connelly machines Lead	Wagons		Private collectors; Col by city		Dumps	Private collector		Wholly able to wagons			Piggery	None	
Baltimore	558,485	Day labor	310 sweepers; 160 carts	Year	1, 2 or 3 times a week as necessary	All classes		$2 8-hrs	White duck		Laborers	Laborers	Gang and sqdeg gas machines	Carts		Dual	City	Carts	From rear carts	Dumps	City	Carts	High sides cover's tops	Rear dump	Reduction	One
Boston	670,585	Day labor & contract	190 sweepers	Year	Once a week	Americans		$2.50 8-hrs	Khaki	6 mo.	City	Laborers	Squeegee and pneumatic	Carts		Triple	Contractor	Wagons	Hand dumped	Contractor	Contractor	Wagons	Steel	Automatic rear dump	By contract	One
Chicago	2,207,638	Day labor	1210 sweepers	8 mo. residence 12 " business	Weekly-residence Daily-business	All classes	Civ. service	$2.25 8-hrs	Khaki				Pneumatic	Carts & wagons	Dust	City	Wagons	Hand	City dumps	City	Wagons	Horses steel box	Steel	Derrick	Reduction	None
Cincinnati	363,591	Day labor	73 with wings; 102 broom hnd	290 Days	Twice week resid.; Daily business	All classes		$2.00 8-hrs	None				Pneumatic	Carts & wagons	None	City	Wagons	Lever dumping	Dumps	City	Wagons	Iron boxes	Steel	Lever dumping		None
Cleveland	560,663	Day labor	450 sweepers	9 mos. residence; 10 " business	Daily, once a week Semi-monthly	All classes		$2.00 8-hrs	White Canvas		Laborers	Laborers	Pneumatic	1-horse wagons	Triple	City	Dump wagons	Rear and dump wagons	Dumps	City	Rear and dump wagons	Rear and dump wagons	Canvas	Dumped	Reduction	Zone
Columbus	181,511	Day labor	105 sweepers	40 weeks	1 or 2 a week	Americans		$2.25 8-hrs	None				Pneumatic	Carts	Triple	City	Dump wagons	Lower Dumping	Dumps	City	Wagons	Pedestal wagon	Hand hoist	Hand hoist	Reduction	Zone
Detroit	465,766	Day labor	300 sweepers	Until freezing	Weekly	All classes	Civ. service	$2.00 8-hrs	White cotton		Laborers	Laborers	Sewer & Pneumatic flushers	Wagon	Dual	City	Wagons	Hand labor	Dumps	City	Wagons	Ingle-ear steel boxes	Canvas	Hand dumped	Private reduction company	None
Grand Rapids	112,671	Day labor	75 sweepers	8 mo. residence; 12 mo. business	Semi-weekly	Americans		$2.00 8-hrs	Khaki Duck	6 mo.	Laborers	Laborers	Sewer, pneumatic and hose	Wagons; carts	Triple	Private individuals	Wagons	Dumped from wagons	Dumps	City	Steel Tanks on wagons	Steel tanks	Steel	Elec-hoist to cars	Gravation & piggery	None
Indianapolis	263,850	Day labor	275 sweepers	Year	Weekly	All classes		$1.75 8-hrs	None				Sewer, flusher	Wagons	None	Contract	Wagons			Contractor	Wagons			Self dumping	Reduction	None
Kansas City	248,381	Day labor	225 sweepers	Year	1-3 week residence Daily business		Clerks	White & brown duck		2 mos.	City	Laborers	Sewer and pneumatic	Carts, wagons trucks	None	Individuals	Wagons		Used for filling	Contract	Wagons	Wood tanks	Wooden		Pod to hogs	
Minneapolis	301,409	Day labor	175 sweepers	9 months	Weekly	Italians	Physical exam Required	$2.25 8-hrs	White duck	3 mos.	Laborers	Laborers	Sewer, flusher and pneumatic	Carts		Individuals			Dumps	Contract	Steel Tanks on wagons	Steel tanks	Canvas	Rotated by crane	Incinerated	One
Milwaukee	373,857	Day labor	250 sweepers	8 mo. residence; 10 mo business	2 or 3 times per year	Americans & Italians		$2.00 8-hrs	White duck	6 mos.	Laborers	Laborers	Sewer and squeegee machines	Carts & wagons	None	City	Wagons	Bottom dump	Dump and incinerator	City	Single wagon	Iron boxes	Iron	Hoisted by crane	Incinerated	None
New Orleans	339,075	Day labor	340 sweepers	Year	Daily	Americans		$2.00 8-hrs	White duck		Laborers	Laborers	Pneumatic	Carts & wagons	None	City	Carts	Hand labor	Dumps	City	Carts			Self dumping	Dumped	None
New York-Manhattan		Day labor	2800 sweepers	You-	No alleys No paved alleys	Italians	Civ. service	$2.50 8-hrs	White duck	1 year	Laborers	Laborers	Pneumatic power hose	Carts	Triple	City	Carts	Hand labor	Land fills Inland	City	Carts	Steel carts		Self dumps	Reduction	None
Queens	284,041	Day labor	106 sweepers	Year	In borough	Italians	Civ. service	$2.50 8-hrs	White canvas	1 Year	Laborers	Laborers	None	Carts	Triple	City	Carts	Hand labor	Land fills	City	Carts	Steel carts	Canvas	Self dumps	Cremation Reduction	None None
Bronx	430,980	Day labor	120 sweepers	Year	Daily	Italians	Civ. service	$2.50 8-hrs	Khaki duck	1 Year	Laborers	Laborers	Sewer, flusher	Carts	Triple	City	Carts	Hand labor	Land fills	City	Carts	Steel carts from carts		Self dumps	Incinerations	None
Richmond	85,089	Day labor	26 sweepers	Year	No alleys	Italians	Civ. service	$2.00 8-hrs	White canvas	1 Year	Laborers	Laborers	None	Carts	None	City	Carts	Hand labor	Land fills	City	Carts	Carts		Self dumps		
Omaha	124,096	Day labor	42 White wings; 2 gangs	Monthly		All classes		$2.00 8-hrs	White canvas		Laborers	Laborers	Pneumatic	Wagons		City	Wagons	Hand labor	Dumped on low ground	City	Wagons	Iron boxes		Dumped on fills	Piggery	
Portland	207,814	Day labor	225 sweepers	Year	No alleys	Americans	Physical exam	$3.00 8-hrs	White Overalls duck	10 mos.	City	City	Pneumatic	Auto trucks and carts		Contract	Wagons	Hand labor	Dumped in fills	Contract	Wagons	Dump wagons	Canvas	Hand dumped	Incinerator	
Philadelphia	1,549,008	Contract	1249 sweepers	Year	Weekly	Italians		$1.50 8-hrs	White Overalls duck		Contractor	Contractor	Power, Flushers and hose	Wooden sweeping and steel carts	Triple	Contract	Wagons	Back dump	Dumped	Contractor	Wagons	Metal bodies rear dump	Metal	Dumped rear	Reduction	None
Providence	224,326	Day labor	100 sweepers	9 months	No paved alleys	Italians		$1.75 8-hrs	Khaki	6 mos.	City	Laborers	None	1-horse carts		Privately				Contractor	Wagons	Steel beams	Wood	Shoveled on	Piggery	None
Rochester	218,149	Day labor & contract	105 sweepers	8 mo. residence 1 yr. business	Daily to bi-weekly	Italians		$2.00 8-hrs	None Khaki				Pneumatic	Wagons	Triple	Contract	Wagons	Dump wagons	Burned and sold	Contract	Wagons	Steel wagons	Canvas	Tipping bottom rear dump	Reduction	One
San Francisco	416,912	Day labor	171 sweepers	Year	1 to 4 times monthly	Irish	Physical exam	$3.00 8-hrs	None				Pneumatic and hose	Wagons	None	Contract	Wagons	Dump wagons	Land dumps	Contractors	Wagons	Metal lined water tight box	Metal	Rear dump	Privately owned destructor	None
Seattle	237,194													Wagons	None	City	Wagons	Dumped	Incinerator	City	Wagons	Wooden wagons		Dumped	Incinerator	Five trucks
St. Joseph	77,403	Day labor	31 sweepers	8 mos. residence	3 times weekly when necessary	All classes		$1.75 8-hrs	White duck	3 mos.	Laborers	Laborers	Hose	Wagons	Dual	Contract	Wagons	Rear dump	In river	Contract	Wagons	Tank wagons	Iron	Rear dump	In river	None
Toledo	168,497	Day labor	85 sweepers	8 mos. residence 1 yr. business	Daily in business section	All classes		$2.00 8-hrs	White & brown duck	1 year	Laborers	Laborers	Pneumatic	Patent dump wagon	Dual	City	Wagons	Rear dump	Dumped in low lands	City	Wagons	Metal tanks	Metal & canvas	Derrick	Reduction by contract	3 trucks to haul from loading station
Washington	331,069	Day labor	400 sweepers	Year	Weekly	Negroes		$1.80 8-hrs	White duck		Laborers	Laborers	Pneumatic	Carts & wagons	Triple	Contract	Wagons	Hand labor	Incinerated sold and dumped	Contract	Wagons	Steel removable bodies	Steel	Derrick	Reduction	

STREET REPAIRS

SOURCE	METHOD OF HEATING	FREQUENCY OF OILING	MACADAM OIL USED	STREET
General tax	Day labor	Annually		
General tax	Contract & Day labor	15 days to 3 mons. inclusive	$.0471 per sq. yd.	
Vehicle tax	Day labor	Once to twice per year	$.042	
General tax	Day labor	Once a year where oiled	$.025	
General tax	Day labor	Not oiled		
Warrantation	Day labor	Not oiled		
Appropriation	Day labor	Once a year		
Appropriation and Appellate	Day labor	2 or 3 times a year	$.0192 sq. yd.	
Appropriation	Day labor	3 months	$.01 sq. yd.	
General city tax	Day labor	Once a year	5# to 14 per grade oil	
By ordinance	Day labor			
Appropriation	Contract & Day labor	Twice a year		
Appropriation	Day labor			
Appropriation	Day labor	Four times a year	1 to 24 sq yds per gal.	
Appropriation	Day labor			
General tax	Day labor	Once a year	$.087 per sq. yd.	
Appropriation	Day labor	When dusty	1 3/4 to 2# per sq. yd.	
Appropriation	Day labor	Not oiled		
Appropriation	Contract and day labor			
General tax	Contract and day labor			
Appropriation	Day labor	Twice a year	.07# sq. yard	
Appropriation & bond issues	Day labor	Upon completion when needed	Compute on oil with own equip. for 7# per gal.	

Pavement: Sheet asphalt; Brick; Asphalt block; Macadam; Granite block; Wood block; Concrete; Cement block; Bitulithic; Sheet asphalt

permits. The street dirt is collected by the sweeper in dirt wagons of approximately 12 cubic feet capacity, and dumped into vacant lots or into unused alleys, where it is picked up by dirt wagons and hauled to the dumps. In the business streets dirt boxes placed on the edge of the sidewalk supplement the street dirt wagons. The dirt collected by the sweeper is dumped into these boxes, which are emptied into the street dirt wagons and hauled to the dumps.

In the course of the investigation, special study has been given to the uniformity of the cleaning service and the provision of definite cleaning schedules in different wards of the city. With no uniform schedule, and with appropriations not based upon definite amount of cleaning work, the frequency and area of paved streets and alleys cleaned in the various wards has depended largely on the amount of funds available for this purpose. The street bureau was compelled to plan its work so as to expend the money appropriated for the use of each particular ward without respect to the actual needs and requirements of all sections of the city. Because of this, no uniform service has been given or uniform standard of cleanliness of streets and alleys maintained.

Since the beginning of this investigation special emphasis has been laid on the installation of uniform and definite schedules for the cleaning of streets and alleys, based entirely upon the conditions and requirements in each particular section. Details of the studies made, the standards adopted and the schedules now in force in the entire city are given in what follows:

Because of the limitation in appropriations for this activity, the number of cleanings now given to the improved streets and alleys is of necessity uniformly restricted. The installation of uniform schedues will have the effect of unifying the service throughout the city and increasing the standard of service now given. While the city streets and alleys now receive reasonably good cleaning, the additional estimated expenditure of about 20% of the present street cleaning appropriation, or from $200,000 to $250,000 each year, for this service would permit changes in the present schedules which will provide for a minimum of six cleanings per week for all improved streets and alleys in the city.

SCHEDULES FOR STREET CLEANING.

For the purpose of checking expenditures and determining to what extent the bases and uniform schedules were being carried out, over 320 separate reports have been transmitted to the Street Bureau which indicated the conditions obtaining in every section of the city and such changes as were necessary in order that the service of street cleaning be made uniform for the whole city.

To obtain effective and economical administration of any activity it is necessary that the unit of work be established and the responsibility of each employe fixed. This principle is no better illustrated in the matter of street cleaning than by the so-called "block" system of street cleaning, which has now been extended throughout the city.

By this system each man is allotted a definite area of pavement to clean, which varies in extent, depending upon the local conditions as to traffic, physical condition of pavement, location of street as regards proximity to public buildings, population, unpaved alleys, street car rights of way and frontage on street. The system has been largely used in Chicago, although the lack of funds in many wards, together with the character of pavement, has made the cleaning of streets by supplementary gang system necessary.

With the information collected during the investigation of 1912 as a basis, and with the supplementary studies made during this investigation into the existing conditions and needs, uniform schedules were prepared for installation in each ward of the city. In all cases the preliminary schedules were submitted to Bureau of Streets officials and to the respective ward superintendents, and before the final schedule was installed in each ward suggestions of changes were considered and incorporated where it was found that special conditions existed. As a result of this practice, uniform schedules have been installed in every ward of the city, and are now in effect and working out to the general satisfaction of the officials, employes and residents.

While the primary principle of furnishing uniform service throughout the city has been continually kept in mind in the preparation and installation of these schedules, special conditions, such as character of population and district, nearness to public buildings, parks, etc., necessarily had to be considered in the practical application of this principle. The schedules now installed throughout the city are based on the combined application of scientific and practical study and experience, and while minor changes will of necessity be made from time to time because of varying and changing conditions, the schedules now working should furnish the basis in the future for the street cleaning service in this city. These schedules have in each case been prepared to show the character of pavement, area of pavement, number of cleanings or patrols per week, equivalent area per cleaning week, and the standard of work required of each street cleaner. Complete copies of the cleaning and waste collection schedules which, with the exception of minor changes, are now working in the city, have been prepared. Copies of these schedules are to be kept in the different ward offices and in the office of the Bureau of Streets and the Commisioner of Public Works, and all changes noted from time to time. A sample set of the cleaning schedules now working in the 16th ward is shown in Appendix "D."

These schedules are being adhered to by each street cleaner and section foreman, subject only to changes or variations on account of climatic conditions, street repair and other necessities. In all cases schedules have been made under the direction of the Superintendent of Streets in the general office in conjunction with the ward superintendent. Reports have been submitted from each section foreman to his superintendent, and by the latter to the central office. The adherence to these schedules as from time to time modified and definite routes will make it possible within a very short time to obtain a standard of the work performed by each employe and the value of his work compared with the salary paid.

It is recommended that these schedules for street and alley cleaning prepared upon analysis of all conditions affecting street cleaning be used as a basis for the appropriations for such work, and that the area of pavement allotted to any one man and the number of cleanings per week be apportioned on this basis, and that the employe assigned to each route be required to maintain the standard of service defined in such schedules.

UNIFORM STANDARDS FOR STREET CLEANING.

Unscientific apportionment of appropriations in the past has been the cause of the lack of uniformity in the street cleaning service, as some wards received less money in proportion to their needs than did other wards. The result of this has been that no definite and uniform standards could heretofore be formulated for the cleaning of streets of the city as a whole. There was a great variation in the area allotted to each block man, and no rule was established as to the frequency of cleaning which any pavement was to receive.

As a basis for the estimates of appropriations for the cleaning of streets and alleys, the study of the conditions and characteristics of every street and alley of the city was continued during the past year, and definite standards and units have been formulated upon which the schedules now in use have been based. The details of the units and standards upon which these street cleaning schedules are based are given under the heading "Street Cleaning Factors and Standards."

In preparing the estimates of appropriations for street cleaning during the year 1914, it has been assumed that the street cleaners will maintain an average of approximately 74.4 per cent of the 85 per cent attainable of the perfect standard of work. It is believed that 85 per cent of the perfect standard is the percentage which is reasonable to expect of the average good and able employe. With the provision of uniform schedules and standards and good control of the supply and efficiency of laborers, the effectiveness of the service in the cleaning of streets and alleys will be further increased.

CLASSIFICATION OF PAVEMENTS.

To obtain definite standards and schedules for cleaning of streets and alleys and the need of repairing of such streets, the routing of teams and wagons collecting the city wastes, it was necessary to ascertain the amount and character and physical condition of all pavements in the city.

This data has been collected and tabulated in such a manner as to be of use in this study and for future uses of the Bureau of Streets and other city departments in the shape of tables and working ward maps which show the area and kind of pavement in every street and alley in the city of Chicago. To make these maps complete and correct in all details it was necessary to go through all of the records of the Board of Local Improvements and the Street Bureau and make special survey of those pavements which have been laid by private contract and by the street railway corporations. The rights of way, the number of car tracks and subways in every street in the city were obtained from the records of the Board of Supervising Engineers and the street railway companies. The records were verified by field surveys and study of the pavement records in each of the city ward offices.

The compilations given in Tables IX and X herein are the complete record of the different kinds, areas and conditions of pavement obtaining in the city. Tables XI to XIII, inclusive, give the areas and kinds of pavements now out of reserve, and those which will pass out of reserve in each of the years from 1914 to 1917, inclusive.

As indicated in these tables, the pavements in the city of Chicago which control the expenditures for street and alley cleaning and street repair work in the city are asphalt, brick, granite, macadam and creosote block.

The cedar block pavement, of which there still remain approximately 1,380,000 square yards, is generally in poor condition, and is either being replaced by improved pavements or being covered with macadam.

The different pavements in the city streets and alleys have been classified according to the physical characteristics for the purpose of determining the amount and character of cleaning and repair as follows:

Improved—Permanent.

(a) Smooth pavements, including asphalt, creosote block and bitulithic.

(b) Rough pavements, including brick, granite, cobble and rubble, and other pavements which require that the dirt be picked from interstices.

Improved—Not Permanent.

All macadam pavements and country roads.

The oiling of macadam within the past few years has had an excellent effect on the macadam pavements, and has given them a solidity and usefulness almost approaching improved permanent pavements.

Unimproved Pavements.

Under this classification are included all streets that have not been paved, as well as those having old cedar block pavement, which, as noted above, is in such poor condition as to be considered unimproved.

SOURCES AND VOLUME OF STREET DIRT.

The dirt which collects upon the streets and alleys of a city is derived from a number of different sources, the principal ones of which may be summarized under the following heads:

1. Excrement of animals.
2. Material lost by passing vehicles.
3. Dirt swept from sidewalks and thrown from buildings into the street.
4. Dirt from unpaved streets and alleys.
5. Falling leaves.
6. Building construction.
7. Soot and dust from the air.
8. Material originating from the wear of pavements.

The quantity and volume of dirt directly attributed to horse-drawn vehicle traffic is readily appreciated when it is realized that on an average 1,000 horses excrete an average of 500 gallons of urine and 10 tons of dung during a working day of eight hours. This is the most important source of street dirt, and has been given the greatest weight in the preparation of the schedules and standards used as a basis for the estimates of future work and expenditures in street and alley cleaning.

The loss of sand, coal, crushed stone, hay, manure and other loose material from poorly constructed wagons, or from overloaded wagons, adds greatly to the quantity of street dirt to be removed. In many cases, street dirt carts and wagons contribute their share by allowing wet street dirt to ooze out upon the streets through poorly constructed boxes.

The practice used by residents in many sections of the city where the streets and alleys are made the repository for dirt and filth of the household does much towards adding to the amount of dirt to be removed. Failure to collect house refuse according to a fixed schedule has caused cans to be overturned and contents scattered about the pavements and alleys.

Another source which is important during wet seasons is the dirt which is carried by moving vehicles from streets and alleys on to hard pavements. This is principally done by peddler wagons, pushcarts and delivery wagons whose drivers travel through the streets and alleys to sell or deliver their wares. However, the amount of street dirt actually attributable to this source is considerably less than is usually believed.

The cleaning and removal of street dirt proper from pavements is a very necessary and important function, both from an esthetic and a sanitary standpoint. There is also considerable refuse in the form of leaves and grass which accumulates in residential streets and along parks and boulevards, which is objectionable, in that it has a tendency to lodge in catch basin inlets and stop the free flow of storm water. The quantity of leaves accumulating in the short "leaf season" on streets far exceeds that which naturally drops on to the surface of streets alone, because of the additional cleaning from the lawns and parkway spaces. This requires constant attention during this season, and always must be kept in mind by street cleaning superintendents.

An activity which is entirely separate from the street cleaning, yet which must be performed in the outlying wards, is the cutting of weeds along parkway places and vacant lots. The need of this is apparent, because during the autumn season obnoxious weeds are seeding and burrs are caught by clothing, and during the season of heavy dews and rains the weeds protrude over the sidewalks and wet the clothing of pedestrians. The heavy growth of weeds on either side of the street, which keeps the ground moist and conceals decaying vegetable and animal matter, does not promote sanitation, and is a feature which requires careful attention of the superintendent in charge of street cleaning, as well as the inspectors of the Sanitary Bureau of the Health Department. Leaves and weeds constitute great nuisances in the outlying wards, and problems connected therewith can best be solved in co-operation with residents and with owners of vacant property.

The carelessness with which contractors allow the different materials used in building construction to be scattered about the streets is not only a great annoyance to the street cleaners, but is a prolific source of street dirt, and is a condition which constantly demands the attention of superintendents. This annoyance, together with that caused by the overloading of vehicles and the losing of dirt from overloaded wagons upon the streets, is a matter which can be eliminated by properly enforcing the ordinances relating to these matters.

Soot and dust settling upon the streets from the air are heavier in some districts than in others, and of more importance in the congested residential or manufacturing districts. In most cases it will constitute only a very small percentage of the whole.

The constant abrasion of hard pavements under different kinds of traffic has a tendency gradually to wear out the surface of the pavement, which must be removed by the street sweepers. This source is of special importance in macadam pavements, as it is

this material that forms practically all of the dirt which is removed from pavements of this class.

It is believed that when a fixed standard is established of basing street cleaning schedules carefully on density of traffic, condition of pavements, character of frontage and kind of pavements, a definite relation will be found between the amount of street sweepings collected and the number of sweepers employed. At present it is found that different sweepers average daily collections of quantities varying from three-fourths of a cubic yard to three cubic yards. It has also been noted that street sweepings collected by regular "block" sweepers average about .0045 cubic feet per square yard. The weight of sweepings will, under ordinary conditions, approximate 36 pounds per cubic foot.

From records available there appear to have been collected from the streets of Chicago during each of the past six years the following amounts of street dirt:

1907.....	681,707 cubic yards
1908.....	892,751 cubic yards
1909.....	815,703 cubic yards
1910.....	892,912 cubic yards
1911.....	735,334 cubic yards
1912.....	953,856 cubic yards

Comparative diagrams showing the work done and moneys expended during each of the years from 1907 to 1912 are shown in Tables IV and V and Plate III.

TIME STUDIES.

The series of time studies begun in 1912 were continued on the methods, operations and movements of street cleaners and teamsters employed by the Bureau of Streets with a view of obtaining more definite data as to the effectivness of present methods and efficiency of employes, also of ascertaining standards and uniform schedules for effective and economical cleaning of streets and collection of the city's waste.

These time studies were made in different sections of the city to obtain a general average of conditions and efficiency of employes. They were timed and the work studied with and without their knowledge. As the work progressed, men in different sections were picked out and informed that their work and methods were being observed.

Analysis of the records obtained from these studies disclosed that a proportion of men now assigned to sweep and clean the city's streets have no notion of the principles of doing their work effectively, with minimum waste of time and energy. These studies disclosed other matters which heretofore have not been considered in the assignment and supervision of the work among street cleaners. There being no fixed standards and, in most cases, no definite instruction as to how to proceed in the work, the employes were doing their work as best they could in their own way.

It was ascertained that there are at least thirty-eight distinct motions which a street cleaner makes in street cleaning work. Of these some were found to be unproductive, resulting in loss of time and energy and less effective street cleaning. The most important of these are considered in the following:

Observation of the time spent in wheeling push carts into alleys or to other temporary dumping places disclosed that practically one-fifth of the time was consumed in this activity. This matter has been considered under the heading of "Receptacles for Handling Street Dirt."

The studies disclosed that some sweepers are more efficient than others, due to the stroke of the broom which they make. The practice of hitting the broom on the pavement at the end of each stroke should be stopped, as this motion is not necessary on dry pavements and very seldom required on wet pavements. Effective and practical street cleaning can be obtained by bringing the brush down forcibly at the beginning of each stroke, thus reducing the work at least 15 per cent.

The time studies also disclosed that the time lost by street cleaners in dodging horses and automobiles where traffic is dense is unappreciable, and does not exceed 8 per cent of the total time in the central loop district and not more than 2 per cent of

SUMMARY OF QUANTITIES OF RUBBISH AND GARBAGE COLLECTED AND AREA OF STREETS CLEANED, WITH AVERAGE COST, FOR 1912

TABLE V

WARD	RUBBISH Cu.Yds. Collected	RUBBISH Total Cost Collecting and Removing	RUBBISH Ave.Cost Per Yd.	GARBAGE Tons Collected and Removed	GARBAGE Total Cost Collecting and Removing	GARBAGE Ave. Cost Per Ton	ST.CLEANING Total Square Yds. Cleaned	ST.CLEANING Total Cost Cleaning and Removing Street Dirt	ST.CLEANING Ave. Cost Per 100 Sq.Yds
1	56360	$37,553.25	.67	2585	$8884l.77	$3.44	617,950,060	$193,907.98	$.20
2	59514	31,374.50	.53	5150	14,029.78	2.73	121,094,650	37,926.15	.31
3	44208	26,556.50	.60	4393	12,728.66	2.90	79,223,273	20,765.46	.26
4	36231	19,240.75	.53	3023	10,715.00	3.55	114,077,003	24,498.25	.22
5	24841	14,390.38	.58	2495	8,974.20	3.60	89,347,008	26,076.33	.29
6	34304	20,912.50	.61	3937	10,530.77	2.68	93,392,898	20,154.03	.22
7	42271	24,687.88	.58	3282	9,794.40	2.98	70,567,958	22,710.44	.32
8	33510	21,084.00	.63	NO SEPARATION			39,451,491	15,854.61	.40
9	35071	22,749.00	.65	NO SEPARATION			32,563,864	15,445.46	.48
10	34303	18,315.66	.53	2472	8,741.99	3.54	70,485,360	25,486.96	.36
11	32366	18,765.39	.58	2155	7,296.53	3.38	91,501,264	21,246.14	.23
12	24937	15,398.75	.62	2489	7,081.39	2.84	53,242,934	23,978.47	.45
13	44373	25,853.00	.58	5114	15,801.53	3.09	81,376,498	23,037.25	.28
14	38134	26,094.00	.68	3378	10,958.03	3.24	61,197,549	19,557.61	.32
15	40270	23,535.13	.58	4757	13,520.02	2.84	112,426,018	23,395.77	.21
16	32302	18,855.00	.58	2704	10,172.02	3.76	94,677,038	22,490.62	.24
17	33807	21,816.75	.65	3574	10,238.78	2.87	58,451,478	22,344.02	.38
18	62497	33,813.75	.54	4391	15,934.95	3.63	109,183,554	63,183.83	.58
19	48077	25,208.10	.53	2773	9,215.33	3.32	62,970,117	25,725.14	.41
20	53250	22,879.02	.43	3105	11,257.26	3.62	64,822,142	25,169.04	.39
21	71555	44,671.00	.62	3614	12,568.78	3.48	139,943,375	37,672.39	.27
22	43401	28,128.50	.65	2595	9,484.03	3.66	64,619,444	26,495.21	.41
23	52030	32,111.75	.62	4813	14,289.29	2.96	59,433,516	19,046.85	.32
24	39216	23,788.75	.61	3530	11,690.87	3.31	49,326,373	17,796.98	.36
25	38207	22,366.00	.59	4911	15,340.03	3.12	37,599,928	12,518.93	.33
26	49186	26,158.50	.53	5010	14,538.88	2.90	34,598,687	16,714.97	.48
27	19866	13,352.88	.67	2478	8,378.03	3.38	35,184,118	18,173.71	.52
28	36780	22,024.50	.60	3275	11,795.66	3.60	53,307,836	20,366.51	.38
29	25519	15,972.25	.63	2052	7,179.53	3.50	35,507,307	13,892.30	.39
30	36599	22,003.50	.60	3982	11,823.28	2.99	79,033,044	17,330.34	.22
31	34719	22,424.00	.65	4694	15,124.77	3.24	35,761,854	17,713.09	.50
32	43737	27,550.50	.63	4360	14,996.77	3.44	31,261,033	17,633.15	.56
33	32827	22,250.00	.68	4697	13,455.62	2.87	36,531,781	14,317.26	.39
34	35390	20,190.00	.57	3184	10,412.15	3.28	38,172,071	19,078.01	.50
35	30058	18,603.75	.62	4229	14,279.77	3.38	18,647,557	14,104.88	.76
TOTALS & AVERAGES.,	1,399,716	$830,666.00	Avg .60	119,159	381,174.00	Avg. 3.20	2,866,930,081	955,892.00	.35

TABLE IV.

COMPARATIVE COSTS & AMOUNT & WORK PERFORMED BY BUREAU OF STREETS in RUBBISH & GARBAGE COLLECTION & STREET & ALLEY CLEANING

INVESTIGATION OF WARD APPROPRIATIONS & EXPENDITURES - BUREAU OF STREETS - DEPARTMENT OF PUBLIC WORKS

TOTAL COST & QUANTITY OF RUBBISH COLLECTED & REMOVED BY WARDS

WARD	1908			1909			1910			1911			WARD
	Cubic Yds	Total Cost	Aver-Cu Yd	Cubic Yds	Total Cost	Aver-Cu Yd	Cubic Yds	Total Cost	Aver-Cu Yd	Cubic Yds	Total Cost	Aver-Cu Yd	
1	42,963	$7,034	0.63	37,109	$7,294		37,479	$6,488		32,805	$4,820	0.147	1
2	47,140	$10,258	0.48	42,863	$7,491		42,263	$7,317		42,263	$6,211	0.147	2
3	40,868	$7,932	0.43	41,308	$11,000		40,732	$9,161		46,084	$6,774	0.147	3
4	46,868	$7,182	0.76	46,868	$7,687		46,868	$8,115		46,868	$6,886	0.147	4
5	9,144	$1,647	0.19	20,580	$3,599		20,580	$3,563		21,014	$3,088	0.147	5
6	36,000	$5,700	0.16	37,248	$6,512		37,248	$6,448		37,248	$5,473	0.147	6
7	46,995	$7,548	0.60	45,120	$8,201		45,880	$8,687		46,245	$6,795	0.147	7
8	42,120	$6,932	0.68	41,008	$7,172		41,008	$7,100		41,008	$6,026	0.147	8
9	28,788	$6,160	0.56	28,525	$5,864		28,793	$7,180		28,780	$7,133	0.248	9
10	29,859	$5,229	0.18	29,859	$5,222		29,859	$5,170		28,170	$6,837	0.242	10
11	20,100	$8,041	.53	19,869	$10,000		20,100	$10,000		20,100	$8,000	0.398	11
12	6,000	$1,800	0.65	6,000	$1,950		6,000	$1,946		6,000	$1,950	0.325	12
13	59,560	$9,649	0.15	55,808	$9,061		59,560	$9,649		44,626	$3,837	0.086	13
14	57,808	$9,932	0.14	70,923	$9,932		70,923	$9,932		71,000	$6,390	0.090	14
15	28,462	$3,938	0.14	29,414	$4,118		29,414	$4,118		33,600	$3,024	0.090	15
16	32,760	$5,239	0.16	33,134	$4,639		33,134	$4,639		33,134	$2,982	0.090	16
17	39,200	$6,349	0.32	39,243	$5,494		39,243	$5,494		39,243	$3,532	0.090	17
18	37,963	$7,162	0.23	37,488	$5,248		37,488	$5,248		37,488	$3,374	0.090	18
19	44,981	$6,291	0.33	42,763	$5,988		42,763	$5,988		37,650	$4,308	0.114	19
20	42,000	$6,300	0.33	42,000	$5,880		42,000	$5,880		41,084	$4,726	0.115	20
21	60,000	$9,000	0.51	58,447	$10,104		57,420	$8,038		58,539	$6,439	0.110	21
22	60,000	$11,703	0.51	57,420	$8,038		58,539	$8,195		58,539	$6,439	0.110	22
23	58,000	$8,700	0.15	57,420	$8,038		58,539	$8,195		53,220	$5,855	0.110	23
24	58,000	$8,410	0.14	58,539	$8,195		58,539	$8,195		53,220	$5,855	0.110	24
25	47,044	$8,868	0.19	50,000	$7,000		50,000	$7,000		47,162	$5,189	0.110	25
26	44,000	$8,008	0.18	38,000	$5,320		38,000	$5,320		34,348	$3,818	0.110	26
27	40,000	$8,000	0.18	40,000	$5,600		40,000	$5,600		40,000	$4,400	0.110	27
28	40,179	$8,400	0.18	40,000	$5,600		40,000	$5,600		40,000	$4,400	0.110	28
29	40,000	$8,000	0.18	40,000	$5,600		40,000	$5,600		40,000	$4,400	0.110	29
30	28,818	$5,685	0.22	26,742	$5,087		26,742	$5,087		25,833	$2,841	0.110	30
31	28,818	$5,685	0.22	26,742	$5,087		26,742	$5,087		25,833	$2,841	0.110	31
32	35,095	$10,528	0.33	34,245	$8,208		35,451	$8,508		32,448	$3,568	0.110	32
33	42,000	$7,770	0.31	40,000	$7,600		40,000	$7,600		40,000	$4,400	0.110	33
34	42,750	$9,500	0.31	40,047	$7,209		40,047	$7,209		33,478	$3,682	0.110	34
35	42,750	$9,500	0.31	40,047	$7,209		40,047	$7,209		33,478	$3,682	0.110	35
36	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	36
37	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	37
38	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	38
39	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	39
40	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	40
41	42,750	$9,500	0.31	40,047	$7,209		40,047	$7,209		33,478	$3,682	0.110	41
42	42,750	$9,500	0.31	40,047	$7,209		40,047	$7,209		33,478	$3,682	0.110	42
43	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	43
44	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	44
45	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	45
46	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	46
47	42,750	$9,500	0.31	40,047	$7,209		40,047	$7,209		33,478	$3,682	0.110	47
48	42,750	$9,500	0.31	40,047	$7,209		40,047	$7,209		33,478	$3,682	0.110	48
49	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	49
50	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	50
51	40,000	$8,000	0.31	37,786	$6,801		37,786	$6,801		40,000	$4,400	0.110	51
52	31,279	$7,506	0.31	29,556	$5,320		29,556	$5,320		29,556	$3,251	0.110	52
53										24,000	$2,760	0.115	53
54	5,000	$1,045	0.21	5,000	$1,250		5,000	$1,250		5,000	$1,250	0.250	54
55	5,000	$1,045	0.21	5,000	$1,250		5,000	$1,250		5,000	$1,250	0.250	55
*	1,801,142	332,052	0.34	1,734,925	340,382		1,756,250	340,382		1,691,193	277,337	0.164	*

TOTAL COST & QUANTITY OF GARBAGE COLLECTED & REMOVED BY WARDS

WARD	1908			1909			1910			1911			WARD
	Total Tonnage	Total Cost	Aver per Ton	Total Tonnage	Total Cost	Aver per Ton	Total Tonnage	Total Cost	Aver per Ton	Total Tonnage	Total Cost	Aver per Ton	
1	1,913	$2,870	1.50	1,602	$2,403		1,602	$2,403		1,602	$2,403	1.50	1
2	3,744	$5,616	1.50	3,744	$5,616		3,744	$5,616		3,744	$5,616	1.50	2
3	6,240	$10,920	1.75	6,240	$10,920		6,240	$10,920		6,240	$10,920	1.75	3
4	8,215	$9,348	1.05	8,215	$8,626		8,215	$8,626		8,215	$8,626	1.05	4
5	5,148	$7,201	1.40	5,148	$7,201		5,148	$7,201		5,148	$7,201	1.40	5
6	3,744	$6,177	1.65	3,744	$6,177		3,744	$6,177		3,744	$6,177	1.65	6
7	7,488	$6,739	.90	7,488	$6,739		7,488	$6,739		7,488	$6,739	.90	7
8													8
9	2,288	$ 800	.34	2,332	$ 800		2,332	$ 800		2,332	$ 800	.34	9
10	1,836	$ 611	.33	1,836	$ 611		1,836	$ 611		1,836	$ 611	.33	10
11	6,120	$ 765	.12	6,120	$ 765		6,120	$ 765		6,120	$ 765	.12	11
12	7,147	$10,720	1.50	7,147	$10,720		7,147	$10,720		7,147	$10,720	1.50	12
13	9,027	$13,540	1.50	9,027	$13,540		9,027	$13,540		9,027	$13,540	1.50	13
14	3,927	$ 785	.20	3,927	$ 785		3,927	$ 785		3,927	$ 785	.20	14
15	2,040	$ 408	.20	2,040	$ 408		2,040	$ 408		2,040	$ 408	.20	15
16	2,040	$ 408	.20	2,040	$ 408		2,040	$ 408		2,040	$ 408	.20	16
17	2,040	$ 408	.20	2,040	$ 408		2,040	$ 408		2,040	$ 408	.20	17
18	2,040	$ 408	.20	2,040	$ 408		2,040	$ 408		2,040	$ 408	.20	18
19	3,840	$ 768	.20	3,840	$ 768		3,840	$ 768		3,840	$ 768	.20	19
20	3,840	$ 768	.20	3,840	$ 768		3,840	$ 768		3,840	$ 768	.20	20
21	3,840	$ 768	.20	3,840	$ 768		3,840	$ 768		3,840	$ 768	.20	21
22	3,840	$ 768	.20	3,840	$ 768		3,840	$ 768		3,840	$ 768	.20	22
23	3,840	$ 768	.20	3,840	$ 768		3,840	$ 768		3,840	$ 768	.20	23
24	3,840	$ 768	.20	3,840	$ 768		3,840	$ 768		3,840	$ 768	.20	24
25	5,520	$1,932	.35	5,520	$1,932		5,520	$1,932		5,520	$1,932	.35	25
26	6,240	$1,747	.28	6,240	$1,747		6,240	$1,747		6,240	$1,747	.28	26
27	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	27
28	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	28
29	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	29
30	3,744	$1,048	.28	3,744	$1,048		3,744	$1,048		3,744	$1,048	.28	30
31	3,744	$1,048	.28	3,744	$1,048		3,744	$1,048		3,744	$1,048	.28	31
32	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	32
33	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	33
34	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	34
35	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	35
36	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	36
37	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	37
38	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	38
39	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	39
40	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	40
41	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	41
42	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	42
43	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	43
44	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	44
45	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	45
46	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	46
47	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	47
48	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	48
49	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	49
50	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	50
51	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	51
52	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	52
53	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	53
54	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	54
55	4,992	$1,398	.28	4,992	$1,398		4,992	$1,398		4,992	$1,398	.28	55
*	309,251	$ 77,811	2.99	305,995	$ 77,811		322,458	$ 77,811		309,251	$ 77,811		*

TOTAL AMOUNT & COST OF STREET & ALLEY CLEANING BY WARDS

WARD	1908			1909			1910			1911			WARD
	Lineal Feet	Total Cost	Aver 1000 feet	Lineal Feet	Total Cost	Aver 1000 feet	Lineal Feet	Total Cost	Aver 1000 feet	Total Cu Yds	Total Cost	Aver 1000 Sq Ft	
1	57,728	$ 1,732	30	10,847,634	$ 1,084,763		6,500,281	$ 1,300,056		1,300,056	$ 195,008	0.150	1
2	24,476	$ 734	.03	2,447,600	$ 244,760		2,447,600	$ 489,520		489,520	$ 73,428	0.150	2
3	14,850	$ 445	.02	1,485,000	$ 148,500		1,485,000	$ 297,000		297,000	$ 44,550	0.150	3
4	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	4
5	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	5
6	2,640	$ 79	8.38	6,332,895	$ 633,289		6,332,895	$ 1,266,579		253,303	$ 37,995	0.150	6
7	9,240	$ 277	2.93	2,772,000	$ 277,200		2,772,000	$ 554,400		110,880	$ 16,632	0.150	7
8	19,800	$ 594	6.28	5,940,000	$ 594,000		5,940,000	$ 1,188,000		237,600	$ 35,640	0.150	8
9	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	9
10	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	10
11	5,280	$ 158	3.74	5,137,875	$ 462,409		5,137,875	$ 924,817		184,963	$ 27,744	0.150	11
12	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	12
13	6,600	$ 198	0.47	6,336,000	$ 633,600		6,336,000	$ 1,267,200		253,440	$ 38,016	0.150	13
14	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	14
15	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	15
16	16,104	$ 483	0.38	4,257,600	$ 425,760		4,257,600	$ 851,520		170,304	$ 25,545	0.150	16
17	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	17
18	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	18
19	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	19
20	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	20
21	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	21
22	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	22
23	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	23
24	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	24
25	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	25
26	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	26
27	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	27
28	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	28
29	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	29
30	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	30
31	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	31
32	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	32
33	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	33
34	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	34
35	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	35
36	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	36
37	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	37
38	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	38
39	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	39
40	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	40
41	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	41
42	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	42
43	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	43
44	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	44
45	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	45
46	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	46
47	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	47
48	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	48
49	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	49
50	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	50
51	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	51
52	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	52
53	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	53
54	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	54
55	15,093,780	$ 452,813	1.07	22,380,000	$ 2,238,000		22,380,000	$ 4,476,000		895,200	$ 134,280	0.150	55
*	1,801,142	$ 332,052	0.34	1,734,925	$ 340,382		1,756,250	$ 340,382		1,691,193	$ 277,337	0.164	*

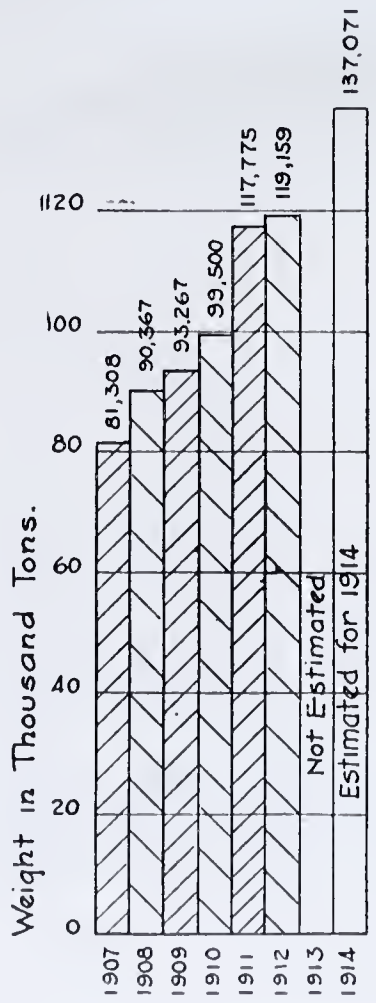
INVESTIGATION OF

BUREAU OF STREETS

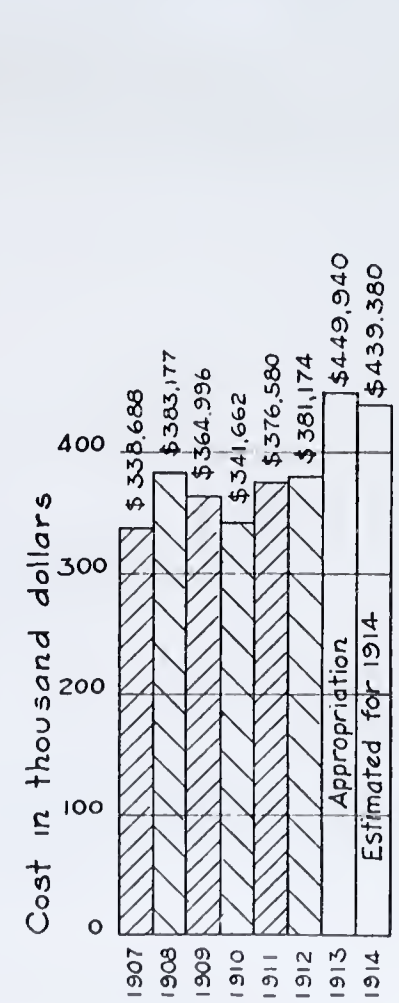
DEPARTMENT OF PUBLIC WORKS

CITY OF CHICAGO

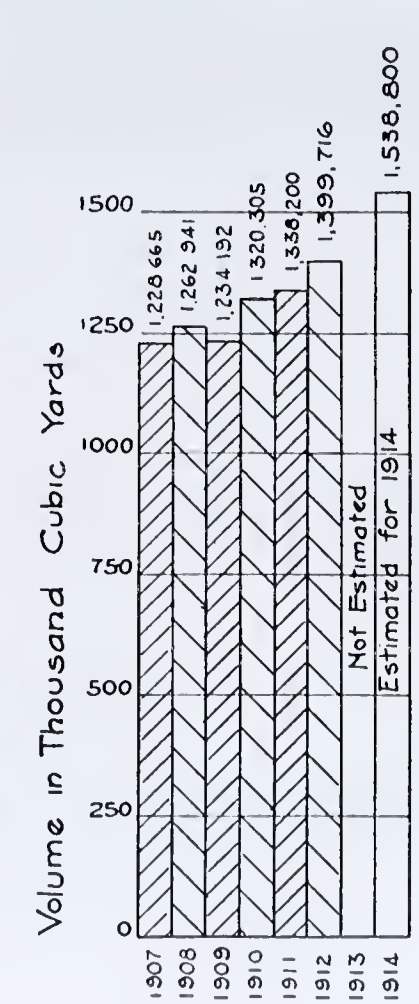
Comparative Diagrams showing by Years Work done and moneys Expended for Garbage & Rubbish Services & Street and Alley Cleaning ~ City of Chicago ~



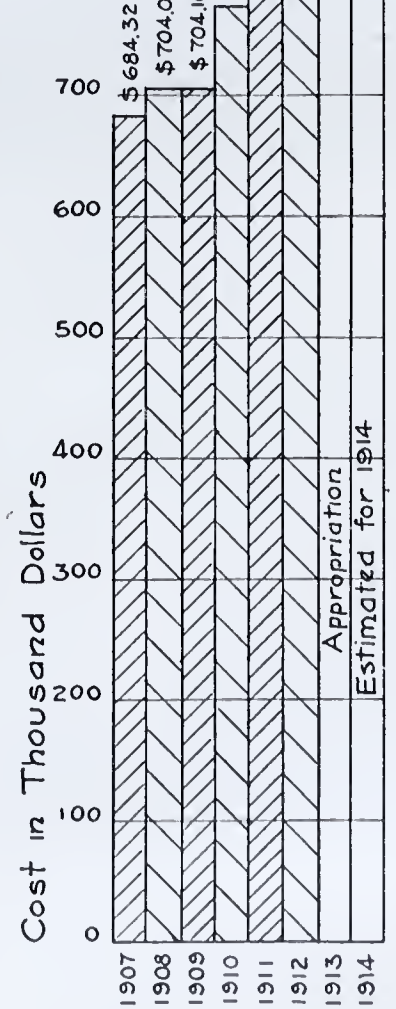
Total Tonnage of Garbage, by Years.



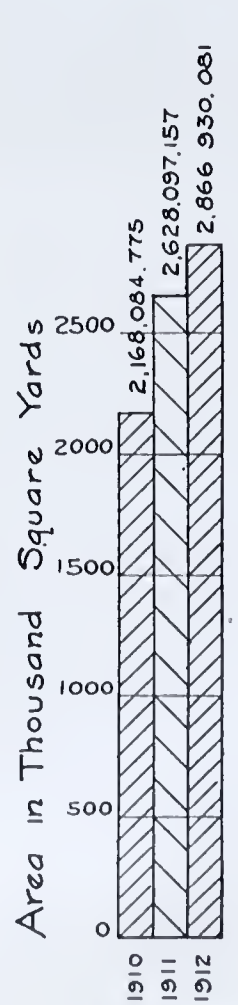
Total Cost for Garbage Collection by Years.



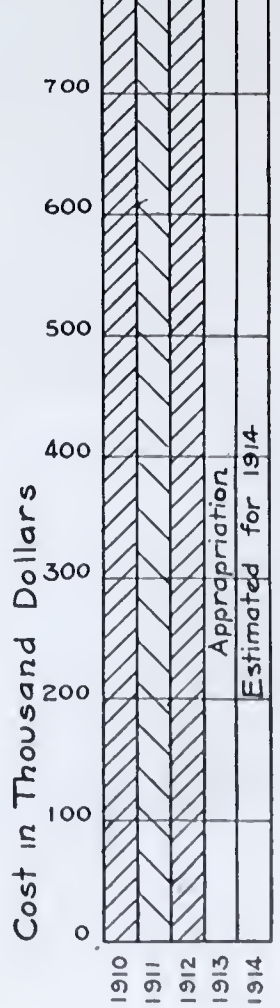
Total Yardage of Rubbish Collected by Years.



Total Cost for Rubbish Collection by Years.



Total Area of Streets & Alleys Cleaned, by Years.



Total Cost of Street and Alley Cleaning by Years.

Efficiency Division - Civil Service Commission

the total time in outlying business streets. It is occasioned more through the congestion of traffic, rather than through density of traffic.

In the studies of the methods used in cleaning light traffic asphalt pavements it was disclosed that after the morning thorough cleaning, three-fourths of the area to be covered during the remaining part of the day does not require thorough cleaning. Scoops equipped with rollers would be well adapted for use on such light traffic pavements and with them one man could patrol a much larger pavement area and still keep the pavement in good condition.

Time studies of work performed by street laborers working in gangs showed that work done by groups in gangs was not as economical as the division of such work through individual assignments. Considerable time is lost in conversation; when one man rests, every other man on the street does the same. While working in gangs, the good sweeper does no more work than the poorest of the gang. Where it is desired to cover a large area of street with men working in groups rather than in gangs, it would be better that each man be given a definite uniform area to cover and require the foreman to time each individual.

The time studies clearly show that the present service is handicapped because of lack of control under present civil service assignment of laborers, instruction and supervision and because of little incentive and recognition of ability and efficiency. With the provision for these requisites and definite standards, there should result an increase in the effectiveness and economy of work and efficiency of employes.

The time studies should be continued regularly for the purpose of:

1. Fixing standards of street cleaning for different pavements under varied conditions.
2. Determining best methods of cleaning each kind of pavement.
3. Determining relative hardness of cleaning various classes of streets.
4. Determining most effective equipment and tools.
5. Determining effect of street car lines and traffic on cleaning of streets.
6. Eliminating unnecessary motions and movements in sweeping and collecting street dirt.
7. Determining uniform and fair distribution of street cleaners for effective control.
8. Determining factors upon which efficiency of employes may be based.

As a result of these time studies, begun in 1912 and continued during this investigation, definite data was obtained and standards were prepared of work of street cleaners under various conditions and on different kinds of pavements. The final standard indicated under the heading of "Street Cleaning Factors and Standards," upon which the 1914 estimates of appropriations are based, was obtained from these sources. The analysis of the records supplied by the Bureau of Streets indicated that able street cleaners who were working regularly and under instructions in proper methods were able to do more than the attainable standard, which is 85 per cent of the perfect standard of work.

Under employment conditions as they exist at present a change which should result in all employes giving service approaching the 85 per cent attainable standard cannot possibly be expected within one year. For that reason, it has been assumed that the street cleaning employes will average 74.4 per cent of the attainable standard of work which is the average obtained in different sections of the city. The estimates of 1914 ward appropriations, given in Tables III and VI, attached hereto, are based on this assumption.

STREET CLEANING FACTORS AND STANDARDS.

The conditions and factors which control the amount and frequency of cleaning of any pavement, other conditions being the same, may be summarized as follows:

1. Density of horse-drawn vehicles and other traffic.
2. Width of street.
3. Character of district and population.

TABLE III.

ESTIMATE for WARD APPROPRIATIONS for 1914
BASED UPON ACTUAL WORKING CONDITIONS OBTAINING in 1913

INVESTIGATION of BUREAU of STREETS — DEPARTMENT of PUBLIC WORKS

WARD	CLEANING of STREETS & ALLEYS — BASED UPON SCHEDULES – (202)					REMOVAL of ASHES & RUBBISH — ACTUAL CONDITIONS-(203)				COLLECTION & REMOVAL of GARBAGE — ACTUAL CONDITIONS-(204)				EMERGENCY — ACTUAL CONDITIONS – (205)					SPECIAL SNOW REMOVAL	GRAND TOTAL		WARD
	A	B	C	TOTAL	%	A	B	TOTAL	%	A	B	TOTAL	%	A	B	D	TOTAL	%		AMOUNT	%	
1	170560	44470	5000	220030	16.5	3500	31500	35000	3.6	2660	6650	9310	21	750	400	700	1850	3.90	77700	343890	12.0	1
2	26345	7800	975	35120	2.6	5600	31400	37200	3.8	3130	12130	15260	35	100	110	100	310	0.65	2650	90540	3.1	2
3	23245	8690	730	32665	2.5	3750	25250	29000	3.0	3180	11220	14400	33	100	110	100	310	0.65	510	76885	2.6	3
4	22510	4465	750	27725	2.1	3400	21600	25000	2.6	2470	3660	10850	25	100	110	100	310	0.65	2370	66255	2.3	4
5	24775	4545	750	30070	2.3	2750	13650	16400	1.7	2950	7250	10200	23	760	930	310	2000	4.20		58670	2.0	5
6	23590	8505	800	32895	2.5	3350	20650	24000	2.5	3020	10830	13850	32	100	110	100	310	0.65		71055	2.4	6
7	22330	6965	650	29945	2.2	3250	24650	27900	2.8	2550	8950	11500	26	400	550	150	1100	2.25		70445	2.4	7
8	14570	3505	325	18400	1.4	3600	23750	27350	2.8					3350	2250	2400	8000	16.90		53750	1.9	8
9	19450	6735	250	26435	2.0	2500	24850	27350	2.8					1000	1450	550	3000	6.40		56785	1.9	9
10	19185	7760	750	27695	2.1	4050	19750	23800	2.5	2740	8260	11000	25	320	120	760	1200	2.50	3150	66845	2.3	10
11	21965	7765	730	30460	2.3	3325	16075	19400	2.0	2410	7350	9760	22	280	140	580	1000	2.10		60620	2.1	11
12	14170	4245	400	18815	1.4	2550	16150	18700	1.9	2400	8490	10890	25	660	1640	700	3000	6.30		51405	1.8	12
13	25600	9175	900	38675	2.9	3960	28200	32160	3.3	2900	14600	17500	40	100	110	100	310	0.65		88645	3.0	13
14	27335	9255	900	37530	2.8	3750	25250	29000	3.0	2700	9250	11950	27	100	110	100	310	0.65		78730	2.7	14
15	20660	7325	725	28910	2.2	3750	25250	29000	3.0	3850	12980	16830	38	200	200	100	500	1.10		75240	2.6	15
16	19940	7985	850	28775	2.2	2680	17600	20280	2.1	2950	7200	10150	23	100	110	100	310	0.65		59515	2.0	16
17	20900	11510	900	33310	2.5	3550	23350	26900	2.8	3420	6880	10300	23	100	110	100	310	0.65	2700	73520	2.5	17
18	66865	20745	3100	90710	6.8	4350	32650	37000	3.8	4450	10720	15170	35	300	150	350	800	1.70	18600	162280	5.5	18
19	30925	8865	1250	41040	3.1	4300	22700	27000	2.8	3110	6890	10000	23	100	110	100	310	0.65	2850	81200	2.8	19
20	24615	8965	1100	34680	2.6	4810	24190	29000	3.0	2650	7450	10100	23	100	110	100	310	0.65	5450	79540	2.7	20
21	33820	14505	1400	49725	3.7	4150	43700	47850	4.8	3570	8580	12150	28	260	170	370	800	1.70	12500	123025	4.2	21
22	25540	11500	1000	38040	2.8	4000	28500	32500	3.4	2600	6390	8990	20	100	110	100	310	0.65	4300	84140	2.9	22
23	25280	9220	800	35300	2.7	3550	32450	36000	3.7	2080	13420	15500	35	200	300	100	600	1.30		87400	3.0	23
24	21425	6485	700	28610	2.2	3760	25500	29260	3.0	1420	10580	12000	27	250	275	100	625	1.30		70495	2.4	24
25	25005	9660	510	35175	2.6	2900	25100	28000	2.9	2440	17060	19500	44	300	425	275	1000	2.10		83675	2.8	25
26	28155	8545	850	37550	2.8	2700	27800	30500	3.0	3660	13640	17300	40	200	175	350	725	1.60		86275	2.9	26
27	19535	3090	400	23025	1.7	1900	18100	20000	2.1	3720	10580	14300	33	2000	3000	2230	7230	15.30		64555	2.2	27
28	25310	6595	800	32705	2.4	3450	22150	25600	2.6	2100	9700	11800	27	100	110	100	310	0.65		70415	2.4	28
29	12350	2620	400	15370	1.2	3100	17860	20960	2.2	2540	8160	10700	24	940	1660	900	3500	7.40		50530	1.7	29
30	22320	5935	700	28955	2.2	3350	21150	24500	2.5	3000	10700	13700	31	100	110	100	310	0.65		67465	2.3	30
31	24295	8560	600	33455	2.5	2875	24975	27850	2.9	3910	14260	18170	41	200	375	100	675	1.40		80150	2.7	31
32	21230	6140	500	27870	2.1	3430	30950	34380	3.5	3850	14100	17950	41	500	800	370	1670	3.50		81770	2.8	32
33	21420	6075	550	28045	2.1	2500	25000	27500	2.8	2660	14440	17100	39	460	500	520	1480	3.10		74125	2.5	33
34	18850	5230	500	24580	1.8	2900	20200	23100	2.4	2940	10560	13500	31	650	950	200	1800	3.80		62980	2.2	34
35	22470	5430	700	28600	2.2	2980	20700	23680	2.4	2690	14610	17500	40	320	320	160	800	1.70		70580	2.4	35
	969780	308665	32245	1330830	100	1120520	852500	973020	100	119270	342460	439380	100	15600	18270	13515	47385	100	132780	2923455	100	TOTAL

NOTES Figures & letters given at head of each column indicate account
— Estimates for apparatus, machinery, operation of loading platforms, light-erage & other items not segregated according to Wards not included
— Street & Alley cleaning by private associations except by Citizens Street Cleaning Bureau, not deducted

— Cost of cleaning railway right-of-ways included in this estimate
Figures to the right of totals, show percentage by Wards of grand total estimate
— Emergency estimate includes emergency repairs to streets & alleys & repair of plank sidewalks

— Estimate of the cost of Street & Alley repairs & the oiling of macadam pavement not included in the above, but shown on table XV

Efficiency Division
Civil Service Commission

4. Location of street.
5. Proximity to unpaved streets and alleys.
6. Location of public buildings, parks, etc.
7. Kind and condition of pavement.

The traffic census made in the 1912 investigation was supplemented by a new traffic census over the important streets in the city and these have been used with the figures obtained from other sources as one of the factors for determining the amount of cleaning required in the different sections of the city. The number of points in all the wards where traffic census have been taken to date is 1,283. These are exclusive of the traffic census data of about 120 other points which have been obtained from outside sources.

Traffic census obtained on the 1,400 intersections indicates the changes in the kind and character of vehicles traversing the streets in different sections of the city. It was found that within the last three years the number of auto-driven vehicles in the central portion of the city has increased over 300 per cent and that the number of one and two horse vehicles throughout the city has remained practically constant, while the number of three or four horse drawn vehicles has become practically neglible when compared with the number of one and two horse vehicles.

As a result of the study continued since 1912, it has been definitely determined that the density of horse traffic, which is the total number of horses passing through a given street divided by the width of the street, is the principal factor which determines the number and frequency of cleaning which one street should be given. The experiments made to determine what relation the yardage of dirt collected in any street had to the number of cleanings indicates that this factor is not definite, but is a direct function of all the other factors above noted.

As hereinbefore stated the traffic conditions on a street determine to a great extent the number and frequency of cleanings which should be provided. In order that the service be always distributed uniformly and equitably, it will be necessary that traffic census be made regularly each year in the different streets of the city. Traffic census taken at regular intervals each year will show any changes in the character of the districts and the necessary changes in cleaning service.

The time studies which have been conducted on the work of street cleaners have disclosed the fact that the only effect which the width of a street has upon the cleaning conditions is the determination of the density of the traffic per foot width of street. It has also been determined that the average working time lost by efficient street sweepers, due to dodging traffic on heavy traffic streets, seldom exceeds 8 per cent within the congested loop district and not more than 2 per cent outside of this district. The traffic density per foot width of street seems to have direct relation to the amount of street dirt to be removed and is the important factor which has been considered in estimating the number of cleanings per week which a street should be given to maintain a definite standard of cleanliness. The census on hand of automobile and street railway traffic has been used as a factor in determining the minimum cleanings which a street requires. The amount of dirt attributed directly to automobiles or street railways is inappreciable.

In determining the cleaning to be given any street, it was found that the location of the street with regard to adjacent business, residential or manufacturing buildings or its proximity to unimproved streets and alleys or public buildings, parks, etc., determined to a great extent the number and amount of cleanings which should be provided.

All sections of the city have been classified in accordance with their location in each ward in the city and in accordance with the effect which the above factors were found to have upon the number of cleanings which should be provided. The wards of the city have been divided as follows:

Inlying wards, 1, 2, 4, 10, 16, 17, 18, 19, 20, 21, 22.

Outlying wards, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35.

The analysis of data obtained in the representative sections of the city where a number of special studies have been made and reliable figures have been secured as to

traffic upon streets and the effect of character of district and population has given the following street cleaning constants for such wards and districts:

Ward	Position	Constant of Cleaning: Average residence	Constant of Cleaning: Average business or manf.
5	Inlying	.9	3.0
4	Inlying	1.6	1.5
22	Inlying	4.3	3.8
2	Inlying	1.9	2.3
13	Inlying	2.1	2.9
21	Inlying	1.8	2.6
Average assumed for all inlying wards		2.1	2.6
31	Outlying	2.3	1.9
6	Outlying	1.2	1.0
16	Outlying	2.7	3.5
13	Outlying	3.8	3.5
28	Outlying	2.4	4.3
Average assumed for all outlying wards		2.5	2.8

The averages for the inlying and outlying wards shown above have been applied to all sections of the city in accordance with the above segregation of location of streets and character of district and population.

While the ratio between teams and width of street and the frequency of cleaning does not give an exact constant in any one ward, investigation has disclosed that for all main thoroughfares where conditions are practically similar, these ratios are practically constant. The ratios determined in many of the wards could not be included here because of some special conditions, due either to reduction of street cleaning forces, or to too large an appropriation of funds for the work on hand. The average constants gave average and uniform conditions as they exist in the city.

Upon the above factors the number of cleanings per week which any street having permanently improved pavement will receive is expressed by the equation:

$$N = \frac{E}{C \quad W}$$

where N=number of cleanings per week.
E=total number of horse-drawn vehicles per 8-hour day.
W=width of roadway in feet.
C=constant of cleaning.

In the case of streets in the First Ward north of Polk street, investigation gave data of traffic of vehicles and pedestrians and restricted roadway due to standing vehicles and the general special considerations which necessitate the modification of the value of the constant "C" in the above equation so that the cleaning service be in accordance with requirements and standard maintained.

For residence and street railway streets, or streets on which churches, schools, hospitals, playgrounds and general public institutions are located, the application of these constants to traffic conditions might give results below the necessary minimum. In such cases the formula is used, but the minimum number of cleanings for streets having these characteristics has been determined by a separate basis, as follows:

Minimum Cleanings per Week on Hard Pavements.

	Cleanings per week
Inlying wards (indicated above)	3.0
Outlying wards (indicated above)	1.0

Minimum Cleanings per Week on Car Track Streets.

	Head room up to 3 min.	Head room 3 to 10 min.	Head room 10 min. or more
Inlying wards	6	5	4
Outlying wards	6	3	3

Minimum Cleanings per Week on Streets Having Public Buildings, Etc.

Churches		Schools		Hospitals, parks and general public institutions	
L	6	L	6	L	6
M	3	M	5	M	4
S	2	S	4	S	2

L = Large. M = Medium. S = Small.

Additional Cleanings Provided Where Streets Adjoin Unimproved Streets and Alleys.

In cases where the streets or alleys surrounding the foregoing are unimproved, the minimum number of cleanings has been increased by one-twelfth of the number of cleaning calculated for the improved pavements.

Standard Daily Cleaning Areas.

From an analysis of the time studies of the work of street cleaners, definite data has been secured upon which is based the relative difficulty of cleaning the different kinds of pavements with varying physical conditions. The standards and equivalent areas which it is assumed can be cleaned by one man in one eight-hour day follows:

Pavement	Condition of pavement	Standards	Equivalent sq. yds.
Asphalt	Good	100 % average perfect standard	34,000
Asphalt	Good	85 % attainable standard	28,900
Asphalt	Good	74.4% of attainable standard assumed for 1914	21,500
Asphalt	Fair	90 % of good asphalt	19,300
Asphalt	Poor	80 % of good asphalt	17,200
Creosote blk.	Good	Good asphalt	21,500
Brick	Good	Good asphalt ÷ 1.35	16,000
Brick	Fair	63% of good brick	10,000
Brick	Poor	50% of good brick	8,000
Granite	Good	Good asphalt ÷ 1.60	13,400
Granite	Fair	75% of good granite	10,000
Granite	Poor	60% of good granite	8,000

Analysis of the data also indicates that the presence of car tracks in a street increases the difficulty of cleaning the street, and that under similar conditions, the street car right of way is approximately 15 per cent harder to clean than the pavements outside of the car tracks. In instances where the pavement of the right of way has been found to be different from the pavement of the balance of street, the area of the right of way has been increased by 15 per cent and the paving factors applied.

Cleaning of Improved Alleys.

In cases where alleys are paved with improved pavements and where conditions exist similar to those on streets, the same standards and equivalents as given for the cleaningof streets having similar factors are used, the resulting number of cleanings per week being divided by six. In some instances, the number of cleanings per week that an alley would receive, based upon traffic conditions alone, would give absurd results, and therefore a minimum of two cleanings each week has been fixed for all improved alleys in the city with the exception that the improved alleys in the First Ward north of Twelfth street, the Eighteenth Ward east of Morgan street and the Twenty-first Ward south of Michigan street receive a minimum of six cleanings per week.

Experimental work in connection with the cleaning of improved alleys has demonstrated that the traffic on alleys does not control the number of cleanings to be given, that there is practically no difference in the time required to clean the various kinds of pavements in alleys and that a reasonable eight-hour day's work for an average laborer is eight blocks or approximately one mile of improved alleys. This standard has,

therefore, been fixed and the estimates of appropriations for cleaning of improved alleys have been made upon this basis.

The cleaning of improved alleys as above stated is provided in addition to the regular paper burner service which has been found to economically supplement some of the street refuse removal service.

Cleaning Unimproved Alleys.

The estimate for appropriations for cleaning the unimproved alleys in the inlying wards (indicated above) have been pro rated on the following basis: all unimproved alleys in these wards to be cleaned once every two weeks, the standard day's work to be the cleaning of one mile per day.

Cleaning of Macadam and Cedar Block Pavements.

Study has been made of the cleaning service given to the city macadam and cedar block pavements which are found in dfferent sections of the city as shown in Tables IX and X.

In determining upon a standard for the cleaning of the macadam and cedar block pavements, consideration has been given to the condition of the pavements and the character and location of the district in which the streets are located and uniform service is provided for all streets having similar conditions. In determining the number of cleanings to be given for these unimproved pavements, the following classification of wards has been made:

Intermediate wards: 3, 5, 6, 7, 11, 12, 13, 14, 15, 23, 24, 25, 28, 30, 31.
Inlying wards: 1, 2, 4, 10, 16, 17, 18, 19, 20, 21, 22.
Outlying Wards: 8, 9, 26, 27, 29, 32, 33, 34, 35.

The oiling of macadam streets during the past few years has had an excellent effect upon the surface of these streets. The surface of many has become sufficiently smooth as to require more cleaning than could heretofore be given to the plain macadam streets. Analysis of the standard of work which one man can perform on oiled macadam streets indicates that the rate of cleaning 1¼ miles of oiled macadam in an eight hour day can be reasonably expected of any man and this standard has been assumed in the preparation of estimates for the 1914 appropriations. The number of cleanings which are to be given to these oiled macadam streets is as follows:

	Cleanings Per Week.
Inlying wards (indicated above)	3
Intermediate wards (indicated above)	2
Outlying wards (indicated above)	1

The number of cleanings which it has been assumed will be given to the plain macadam and cedar block streets exclusive of country roads, is as follows:

Inlying wards (indicated above).....6 times during the cleaning season, or approximately 1 cleaning per month.
Intermediate wards (indicated above)..4 cleanings per year.
Outlying wards (indicated above).....3 cleanings per year.

Analysis of the records of the cost of cleaning the macadam and cedar block pavements has shown the following relationship between the total cost of cleaning such pavements and the cost of the spring cleaning of the same pavements, which is shown under the heading "Spring Cleaning." In wards where the macadam and cedar block pavements are cleaned three times per year, the total cost of cleaning these pavements is approximately twice the cost of the spring cleaning. In wards where the macadam and cedar block pavements are cleaned four times per year, the total cost of cleaning these pavements is approximately 2½ times the cost of the spring cleaning. In those

wards where the macadam and cedar block pavements are cleaned six times during the cleaning season, the total cost of cleaning of these pavements is approximately four times the cost of the spring cleanup. In the preparation of the estimates for the cleaning of these streets, these units have been assumed.

Spring Cleaning.

A general spring cleaning is provided for all streets of the city which do not receive attention during the winter months. The heavy dirt which is washed from the center of the street and which accumulates in the gutters during the winter season is piled up and removed from the street before the regular block cleaning work is begun.

Study has been made of a number of different methods which are used in the removing of the dirt in the spring cleaning. The unit costs of such work indicate that the assignment of one man to a definite length of street or the assignment of a small gang of not exceeding three men to definite lengths of street are most effective and economical. Where a gang of three men is assigned to this work, team work is developed by the use of one man in removing the dirt from the roadway and one man each for the gutters. On the granite and brick pavements considerable more brooming is necesssary on the roadway. The granite and brick pavements and the cedar block pavements require that the dirt be scraped from the center of the street to the gutters before piling of the dirt in the gutters can be commenced.

It has been found that the rate of spring cleaning of the center of streets varies with the conditions of the pavement and that the rate of piling dirt in the gutters is practically independent of the condition of the improved pavements, but varies directly with the traffic. In providing the spring cleaning for improved pavements, standards have been determined which are based on these rates:

Center Cleaning Rates.

Class of Pavement.	Car Track, Sq. Yds. Per Day.	Outside Car Track, Sq. Yds. Per Day.
Good asphalt	16,500	18,500
Fair asphalt	12,900	14,800
Poor asphalt	9,200	11,100
Good brick	4,400	5,550
Fair brick	3,340	3,700
Poor brick	1,850	2,960
Good granite	4,400	5,550
Fair granite	3,340	3,700
Poor granite	1,850	2,220
Cobblestone	1,470	....

Single Gutter Rate in Miles per Day.

Times Cleaned Per Week.	Asphalt.	Good Brick.	Poor Brick and Granite of All Kinds.
2	1.8 miles	1.4 miles	1.4 miles
3	1.4 miles	1.1 miles	0.7 miles
6	0.7 miles	0.5 miles	0.3 miles
9	..	0.3 miles	0.2 miles
12	..	0.2 miles	0.2 miles

The above has been used as the basis in determining the number of blocks which the average laborer will cover in the spring cleaning of the improved pavements throughout the city.

In preparing the estimate of the cost of spring cleaning of the macadam and cedar block streets, it has been assumed that where the average traffic per eight hour day is less than 400 vehicles the street has been termed a light traffic street and where the traffic per eight-hour day exceeds 400 vehicles the street has been termed a heavy traffic

street. On this basis it has been found that the unit cost of spring cleaning the macadam and cedar block streets of different physical conditions is as follows:

First-Class Condition, Cost for Cleaning 100 Lin. Ft. — Traffic —		Fair Condition, Cost for Cleaning 100 Lin. Ft. — Traffic —		Poor Condition, Cost for Cleaning 100 Lin. Ft. — Traffic —	
Heavy.	Light.	Heavy.	Light.	Heavy.	Light.
$1.18	$0.90	$1.97	$1.46	$2.25	$1.69

Winter Cleaning.

The analysis of cleaning which should be provided during the winter on main thoroughfares indicated the need for such service on improved streets having traffic over 1,200 vehicles in an eight-hour day. In estimating the appropriations for winter cleaning provision was made for a uniform service of ½ the number of cleanings provided for in the regular summer schedule service provided for all sections of the city as shown in the sample schedule herewith attached as Appendix "D."

On all such improved streets which have traffic less than the above number, provision has been made for the regular cleaning and removal of dirt and snow on the intersections of such streets. These intersections have been divided into two classes, viz., the regular transfer corners, and intersections having street car lines. On the regular transfer corners it is planned to remove the snow and dirt twice each week over the entire intersection and over that portion of the street where passengers arrive from and board street cars. At the intersections having street car lines, it is planned to clean the four cross walks and the area included therein once each week.

STREET DIRT REMOVAL STANDARDS.

The continuation of the studies in the cleaning of streets and alleys has furnished more definite information as to the quantity of street dirt which is collected from the different streets and alleys. Three methods are used at the present time for the disposition of street dirt in this city, viz.;

1. Curbing: This method consists of using the street dirt as a fill between sidewalk and curb, or in low alleys and vacant lots which are adjacent to the streets cleaned.
3. Short Haul: This method consists of the collection of street dirt, from stations at which the street sweepers deposit same, for filling purposes within the ward, and the haul seldom exceeds ¾ mile. One mile has been used as standard for short hauls within wards.
3. Long Haul: This method consists of the collection of street dirt at stations from which it is hauled to the regular disposal dumps used for all city refuse. This method is used in the more congested districts in the city.

While the use of street dirt in curbing and filling streets and alleys is economical and generally necessary in the outlying wards, such filling is at best not effective when permanent improvements are made on these streets and alleys. Until such time as sufficient appropriation is made for the removal of street dirt, these methods of disposition will have to be continued in the outlying wards.

The cost of disposing of street dirt has been estimated on the basis of average quantity collected by laborers, the percentage of same which is hauled and the time taken for such haul. It has been found that a street cleaner collects an average of about 1½ cubic yards of street dirt per eight hour day on improved pavements and about 2 cubic yards per eight hour day on macadam pavements, which are cleaned on the regular cleaning schedule.

The following percentages of the quantity of street dirt collected are at the present time being disposed of by the following methods:

ESTIMATE of COST of WORK for 1914 ENTERING INTO CLEANING of STREETS and ALLEYS
TABLE VI. BASED UPON UNIFORM STANDARDS and SCHEDULES NOW in EFFECT
INVESTIGATION of BUREAU of STREETS — DEPARTMENT of PUBLIC WORKS

WARD	PATROL CLEANING					MACADAM		WHITE WASHING ALLEYS	FLUSHING STREETS	SPRING CLEANING		WINTER CLEANING		UNIMPROVED ALLEYS		CEDAR BLOCK CLEANING		WEED CUTTING	TOTAL COST of LABOR	TOTAL COST of TEAM HIRE	SUPERVISION of LABOR	SUPERVISION of TEAM HIRE	TOTAL LABOR	TOTAL TEAM HIRE	TOTAL of TEAM HIRE & LABOR	WARD
	No. of SWEEPERS		LABOR		TEAM HIRE	LABOR																				
	DAY	NIGHT	STREET	ALLEY	STREET (VALLEY)	DIRT TO BE HELPED	OILED & UNOILED	TEAM HIRE	LABOR	TEAM HIRE	LABOR	TEAM HIRE	LABOR	TEAM HIRE	LABOR	TEAM HIRE	LABOR	TEAM HIRE	LABOR								
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	19	20	21	22	23	24	25	26	27	
1	114	19	133300	8880	37740	6065	50	45	60	4200	500	480	6095	1815	275	120	185	70	15	155425	44470	11425	3560	170560	44470	215030	1
2	33	27	15640	1240	3730	1650	1145	460	50	2100	1150	915	1655	410	385	150	100	35	25	23240	7800	2415	805	25345	7800	33145	2
3	32	0	16155	0	2000	380	0	0	40	1400	390	255	2105	535	225	445	55	15	175	19925	4465	2215	370	22510	4465	26975	3
4	28	11	12850	505	4450	500	2925	440	0	1400	2900	1580	760	130	0	0	5	5	170	22020	4545	2375	380	24775	4545	29320	5
5	28	03	12945	90	1930	365	2110	1475	0	1400	2430	1900	1415	245	0	0	30	15	170	20615	8505	2265	710	23590	8505	32095	6
6	15	0	6885	0	650	65	1470	320	70	1400	1385	830	1245	295	0	0	15	10	485	11620	3505	2660	290	14570	3505	18075	7
7	9	0	4130	0	140	40	4860	1450	80	1400	6665	3680	610	65	0	0	0	0	490	16875	6735	2015	560	19450	6735	26185	9
8	29	0	13310	0	5210	620	10	10	90	1400	270	320	1770	540	185	280	0	0	0	16555	7760	1985	645	19185	7760	26945	10
9	33	0	15150	0	5015	705	250	150	50	1400	395	345	1855	495	675	330	75	30	0	19155	7765	2165	645	21965	7765	29730	11
10	22	02	10100	10	2300	330	510	180	40	1400	485	300	460	45	0	0	35	20	165	12125	4245	1690	350	14170	4245	18415	12
11	41	10	18820	460	5500	765	135	70	25	1400	480	470	3090	995	1010	705	50	35	420	25255	9175	2585	760	28600	9175	37775	13
12	29	03	13250	140	4050	505	30	15	60	1400	465	290	1810	525	1040	740	670	405	205	18155	7325	2095	610	20860	7325	28185	14
13	32	02	13770	320	5125	645	35	30	65	1400	335	510	1425	475	620	440	5	5	20	17240	7985	2035	665	19940	7985	27925	15
14	31	02	14230	90	8030	665	0	0	75	1400	360	605	1790	955	435	370	210	150	0	17855	11510	2085	960	20900	11510	32410	16
15	100	3	45900	1380	14250	2150	145	60	65	2100	620	525	10015	3435	615	285	225	90	0	61115	20745	5020	730	66865	20745	87610	17
16	46	37	21115	1425	6100	985	100	35	25	1400	410	270	3120	340	265	115	15	5	0	27460	8865	2725	740	30925	8865	39790	18
17	35	0	17900	0	6325	835	50	25	50	1400	335	300	1980	715	355	190	25	10	0	21530	8965	2335	750	24615	8965	33580	19
18	49	1	22490	460	9400	1170	255	170	15	2100	540	800	4445	1900	280	130	5	5	50	29710	14505	2695	1215	33820	14505	48325	20
19	35	0	17900	0	8375	835	105	85	60	1400	345	640	2550	700	330	290	15	10	0	22140	11500	2490	960	25540	11500	37040	21
20	50	01	13910	45	3620	485	50	40	35	1400	570	435	2225	465	960	495	50	30	420	18750	6485	2135	540	21425	6485	27910	22
21	26	05	11935	230	2695	340	5115	3040	0	1400	2815	2350	805	170	0	0	10	5	595	21845	9660	2355	805	25005	9660	34665	23
22	43	0	19735	0	3930	555	1200	495	0	1400	1010	2285	1500	425	0	0	25	10	865	24890	8545	2555	710	28155	8545	36700	24
23	27	0	12620	0	970	120	1975	320	0	700	900	500	760	600	0	0	0	0	865	17240	3090	2035	260	19535	3090	22625	25
24	35	03	16250	15	3400	455	70	45	20	1400	605	370	3615	765	1140	595	35	20	170	22375	6595	2305	550	25310	6595	31905	26
25	17	0	7805	0	1155	220	330	130	35	700	955	430	1185	175	0	0	0	0	55	30	150	10735	2620	1395	220	12350	2620	14970	27
26	32	0	14690	0	2550	275	970	270	35	1400	640	440	1775	495	1105	720	95	60	35	19620	5935	2205	495	22320	5935	28255	28
27	25	0	11475	0	2190	270	3830	2200	35	1400	2910	2250	2360	450	0	0	135	70	250	21265	8560	2315	715	24295	8560	32855	30
28	40	0	9180	0	1250	220	3000	1530	20	700	1095	2480	1170	160	0	0	0	0	45	20	965	16595	6140	2125	510	21230	6140	27370	31
29	39	09	12380	0	1520	230	1960	1335	0	700	2510	2310	1190	200	0	0	0	0	25	10	490	18865	6075	2075	480	21420	6075	27495	32
30	32	0	12395	0	2730	405	1090	635	0	700	850	915	1230	220	0	0	60	30	400	16430	5230	1985	435	18850	5230	24080	33
31	58	07	15850	90	3450	445	1065	420	0	700	780	555	1220	290	0	0	30	15	470	19950	5430	2095	425	22470	5430	27900	34
Total			648,690	17,845	177,965	24,380	37,610	17,305	1,195	49,700	42,410	32,820	77,705	21,700	12,765	8,005	2,370	1,280	860	874,650	308,865	90,435	26,695	989,780	308,865	1,298,645	Total

NOTES:- Estimates for cost and maintenance of machinery, operation of loading stations and dumps, and cost of superintendence not included in this table
= Estimated cost of street and alley cleaning by private associations, excepting that done by the Citizens Street Cleaning Association, not deducted from this estimate

= Estimated cost or cleaning street railway right of way included in this estimate
= Estimated cost of special snow removal not included in this estimate

Efficiency Division
Civil Service Commission

Ward.	Curbed. Per cent.	Short haul. Per cent.	Long haul. Per cent.	Ward.	Curbed. Per cent.	Short haul. Per cent.	Long haul. Per cent.
1	0	0	100	19	0	0	100
2	0	0	100	20	0	0	100
3	0	10	90	21	0	0	100
4	50	50	0	22	0	0	100
5	60	0	40	23	10	0	90
6	20	0	80	24	25	0	75
7	40	60	0	25	40	30	30
8	80	20	0	26	40	0	60
9	80	20	0	27	80	0	20
10	0	0	100	28	40	0	60
11	0	0	100	29	40	60	0
12	30	0	70	30	60	0	40
13	15	15	70	31	50	0	50
14	30	0	70	32	50	0	50
15	20	0	80	33	50	50	0
16	0	0	100	34	30	0	70
17	0	0	100	35	40	30	30
18	0	0	100				

The above percentages have been used as a basis in the cost of disposition of street dirt with the following standard load and time required for loading and hauling the street dirt:

1—Average size load, 4 cubic yards.
2—Average size load for one-horse carts, First and Eighteenth Wards, 3 cubic yards.
3—Time required for loading wagons, 1 hour.
4—Time required for loading dump carts, 1 hour.
5—Time required for dumping wagons, 25 minutes.
6—Time required for dumping carts, 7 minutes.
7—Average speed to and from dump, 2.7 miles per hour.
8—Average haul for disposition of street dirt outside of ward, assumed the same as rubbish hauls, shown in Tables VII and VIII.

The question of the economy of hauling street dirt and other refuse by wagon and motor truck and the provision of additional platforms is taken up under the headings "Loading Stations" and "Motor Trucks."

The cost of collection and removal of street dirt from macadam pavements has been found to be proportional to the cost of cleaning such pavements. The latter standard is included under the head of "Cleaning of Macadam and Cedar Block Pavements."

The following is a table showing ratio of the cost of removing street dirt to the cost of cleaning macadam in the different wards of the city:

Ward	Ratio Cost of Team Hire to Cost of Macadam Cleaners.	Ward	Ratio Cost of Team Hire to Cost of Macadam Cleaners.
1	54.5	19	60.5
2	48.5	20	41.0
3	36.3	21	54.5
4	10.9	22	54.5
5	10.9	23	60.5
6	40.0	24	54.5
7	40.0	25	54.5
8	13.3	26	54.5
9	32.7	27	30.3
10	42.3	28	34.0
11	42.3	29	19.4
12	27.8	30	30.3
13	30.3	31	54.5
14	54.5	32	49.7
15	26.6	33	60.5
16	48.5	34	54.5
17	64.2	35	30.3
18	60.5		

The following ratio has been determined in the spring cleaning of improved pavements which receive regular cleaning throughout the year: An average of 40 yards of street dirt will be collected in the spring cleaning for each street cleaner employed upon regular summer cleaning. In estimating the cost of street dirt removal, it has been assumed that four yards of dirt in the spring cleaning constitute a load, that the time it takes to obtain a load is one hour and that one helper will be used with each wagon. The other assumptions of the quantity and time required for hauling are the same as those used in regular block cleaning.

RELATIVE COST OF CLEANING STREETS.

The lack of uniformity in standards and records maintained in the different cities of the country makes it difficult to compare the relative unit costs of the cleaning of streets of the various cities. Investigation conducted by the United States Bureau of Census into the cost of cleaning of streets, throughout the country, indicated that the unit cost of street cleaning for cities having less than 300,000 inhabitants was less than that in cities having over 300,000. When the many different methods of record and cost keeping are considered, as well as the difficulties encountered in obtaining accurate information as to conditions and methods used in the cleaning of streets, the reasons for these differences are apparent.

With definite and uniform standards of records and cost keeping adopted by the larger cities of the country, a closer means of comparison of unit costs will undoubtedly be found, the differences depending wholly upon the difference in standard of cleanliness maintained. Tables IV and V attached hereto, indicate that in this city the average cost of cleaning 1,000 square yards of pavement by hand, exclusive of overhead charges and interest on the cost and depreciation of equipment, was 42 cents during the year 1910, 36 cents during the year 1911, and 37.7 cents per 1,000 square yards during the year 1912. This includes the cost of all the different methods of street cleaning and the cost of disposal of the street dirt. It has also been ascertained that the cost of street flushing, including the cost of labor, teams and water, averages approximately 14 cents per 1,000 square yards in this city.

A closer check on the unit costs of street cleaning for different pavements in this city will be possible with the complete installation of the new schedule for street and alley cleaning and the uniform record system proposed in the latter part of this report. These definite units will become the basis for making future appropriations and measuring the efficiency of the street cleaning service and of the individuals so engaged.

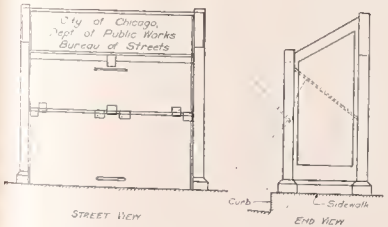
RECEPTACLES FOR HANDLING STREET DIRT.

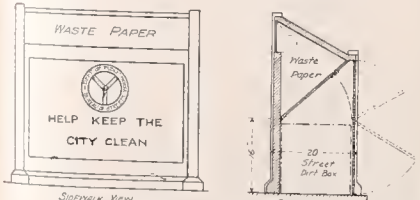
At the time this investigation was begun most of the street cleaning work was done by the "patrol" or pickup system in the inlying wards. The methods employed in the collection of the street dirt under this system vary in different wards and in different sections of the same ward.

Dirt is picked up from the street by broom and shovel, by scraper, or by a patented tool of some kind. Sometimes the dirt is swept along the gutter into piles, but more often it is put into a box or can, located on the sidewalk along the curb. In the less congested parts of the city, street dirt carts are used. When the cart is loaded, it is either dumped where a fill is needed or at stations where it can be picked up by dirt collection wagons.

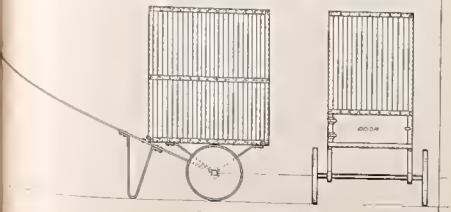
The sweeping of dirt into piles along the curb or dumping of street dirt in the mouths of alleys or in corners is unsanitary, unsightly and uneconomical. The loss of dirt and discomfort to pedestrians resulting from the blowing of dust when the pushcart is dumped into the alleys or corners are great. The additional time spent in hauling of large pushcarts over a great stretch of street and extra handling of same to the dirt wagon, and the duplication of work in reloading street dirt in street dirt wagons increases the cost of sweeping about 20 per cent.

PLATE V.





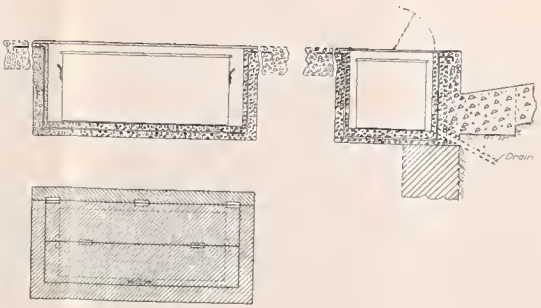
COMBINED HOUSING FOR STREET DIRT BOX AND WASTE PAPER RECEPTACLE.



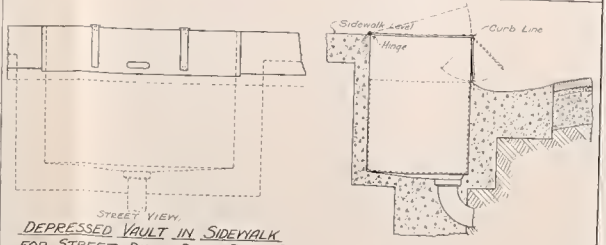
PAPER BURNER

PLATE VI.

PLATE IV.a.



DEPRESSED VAULT IN SIDEWALK FOR STREET DIRT BOX. PLAN 1.



DEPRESSED VAULT IN SIDEWALK FOR STREET DIRT BOX. PLAN 2.

INVESTIGATION OF
BUREAU OF STREETS
DEPARTMENT OF PUBLIC WORKS.
CITY OF CHICAGO

PLATE IV.b.

Efficiency Division-Civil Service Commission Sept 1913

Where traffic is heavy, making the use of the dirt cart impractical and uneconomical, and where there is a large accumulation of street dirt, street dirt boxes have been placed close enough together on the sidewalk along the curb so that they will furnish capacity enough to hold the street dirt between the regular collections. The boxes in use at the present time for this service are made of sheet iron and are 15″x16″x30″ in size.

Plate V shows a sketch of a box for the housing for the present dirt boxes in combination with a compartment for holding waste paper. This may be built of concrete or sheet metal, and made ornamental and attractive.

As above noted, the dirt wagons now used by the street cleaners in picking up the dirt consumes anywhere from 15 to 25 per cent of the time of street cleaners and has not been found as satisfactory as the street dirt box, particularly in the denser business streets.

It is recommended that the wooden pushcart wagons be kept as far as possible in the residence streets and street dirt boxes be substituted for them in the business streets of the city. These street dirt boxes should supplement the pushcart wagons as they are discarded. In the appropriation for equipment for 1914 there should be a provision for at least 6,000 street dirt boxes, to be placed in the more important sections of the city.

The use of storage compartments constructed in alleys and containing room for street dirt cans which may be hoisted from the compartment and dumped into the wagon directly will do much towards removing the objection to the use of the dirt carts and these stations will promote system and economy and eliminate duplication of handling. Such dirt cans which are moved about by street cleaners on light, two-wheeled carts are in use in several of the larger cities in this country and in Europe, and have been found generally satisfactory. It is recommended that 300 dirt cans be tried out in some sections of the city, particularly where wooden dirt carts are in use which must soon be replaced.

In the course of the investigation, the matter of providing depressed vaults for a street dirt box in the sidewalks in the central part of the city was considered. Plate IV shows sketches of two types of vaults for a street dirt box depressed below the sidewalk level, similar to the type of vault recommended by the Committee on Streets (Downtown District) of the Chicago Association of Commerce. In many places in the loop district the use of subsidewalk space for store purposes and the close proximity of pipes and wire to the lower side of the sidewalk would make the construction of such vaults rather costly. In such places in the loop district where the construction cost of this type does not make their adoption prohibitory, their use would go far towards relieving the already congested sidewalks and would help greatly to increase the cleanliness and sightliness of the streets.

MACHINE SWEEPING AND CLEANING.

Probably no system of street cleaning employed by any municipality or private organization has been so universally used at one time or another as machine broom sweepers. An objection to this system of cleaning is that it is not sufficiently effective. The efficiency of this system is considerably reduced because these sweepers meet continual obstructions in busy streets, and when operated over paved streets the brooms remove the coarser fragments of dirt only and leave the finer objectionable particles on the street. Where the rotary broom is preceded by a street sprinkler, objection has been raised that the dust forms into mud and clings to the surface of the pavement, and where the pavement is rough the mud is forced into the joints between paving blocks. As the street becomes dry, the dirt pulverizes and appears again as a dust nuisance.

In all but one instance, machine sweepers have been dispensed with in the city of Chicago. South Water street, the heavy wholesale fruit district of the city, is badly congested during the day, which makes it impossible to effectively clean this district by the "block" system. This street becomes very dirty during the day and is

covered with a thick layer of dirt and debris at night. In this instance, the broom machine appears to be effective and gives fairly good results in the cleaning of this coarse material.

The matter of providing means and equipment for the cleaning of streets with view of eliminating the dust nuisance has been considered and analyses have been made of the various methods used for this purpose. Mixing of calcium chloride with the water which is sprinkled in the different sections of the city would greatly add to the effectiveness of street cleaning and eliminate the perils of dust.

From the standpoints of sanitation and economical cleaning, there is at present probably no better system of cleaning streets than the use of street flushers and washers. Three different system of street flushing or washing are at present in use in different cities in this country. One consists of the use of the squeegee, which is a vehicle having a tank and a revolving rubber roller, which washes the pavement as the vehicle moves along the street and the water from the tank is sprinkled in front of the roller. The second method is that used in the cities having graded streets and sufficient water supply, and consists of the flushing of the pavements by a stream of water from a hose connected to hydrant. The third method is that of flushing by the use of pressure tanks, which are moved about on vehicles and which depend for their pressure either upon the pressure from the water mains or upon the pressure obtained from a pump operated by a gasoline engine.

There is little cleaning done in the city of Chicago by either of the first two methods and this is done by some of the private improvement associations. All of the street flushers which are operated by the city are of the type which depend for their pressure upon the pressure maintained in the water mains, which, except in a few instances, does not ordinarily exceed 30 pounds.

The cleaning of streets with flushing machines has been given considerable study in the larger eastern cities of this country, principally Washington, D. C., Boston, Philadelphia and New York. Personal inquiries and the analysis of reports from these cities seem to indicate that the use of flushing machines on rough and smooth pavement and the use of squeegees on the smoother permanent pavements have given more effective cleaning than the ordinary block or gang cleaning, where it is practicable to substitute same.

It is believed that the city can profitably experiment with and make good use of several such machines, and at least three squeegees and two new pressure flushers should be bought by the city this year for use in the down town section.

LITTERING OF STREETS—MANURE VAULTS.

For many causes there is a lack of uniformity in the enforcement of city ordinance regarding the littering of streets and alleys. Success in this matter depends largely upon co-operation between citizens and the officials of the Bureau of Streets in their respective wards. Influence frequently nullifies the enforcemnt of ordinances and tends to make officials indifferent to such violations.

An analysis was made of the character and per cent of waste thrown about by pedestrians in the streets and by business houses in densely populated sections of the city. It was found that a great portion of street dirt collected by street cleaners consisted of waste paper and other light litter. It would appear that with the co-operation of merchants a considerable portion of such litter could be kept off the streets, and if street cleaners would patrol the streets for loose paper and deposit same in the street dirt boxes provided at different points along such streets, a great portion of the cleaning work would be saved, and the streets would generally appear cleaner.

The ordinance regarding the littering of streets and alleys and the ordinance pertaining to the construction of manure vaults were not found to be uniformly enforced and in many sections flagrantly violated. This is the result, to a certain extent, of the policy adopted by the Bureau a few years ago which allowed the use of wooden manure boxes by residents until such time as the alleys were permanently improved

The enforcement of the ordinances and regulations regarding the construction and location of manure boxes was taken up with the chairman of the Committee on Health of the City Council and the Department of Health. An amendment to the present ordinance is now before the City Council, which provides that all manure boxes in the alleys be placed upon private property and that they be built of concrete and be under the direct supervision and inspection of the Department of Health. The passage and enforcement of this ordinance will tend to better the conditions now found in many alleys where manure boxes are located. The importance of the enforcement of such an ordinance is brought out when it is considered that there are at the present time approximately 82,400 horses, mules and cows in the city, which produce approximately 600,000 tons of manure annually, which must be removed from the alleys in the different sections of the city.

The following is a summary of the estimated number of animals and quantity of manure produced in the city each year as obtained from the records of the City Collector's office, the Department of Health and from the United States Census Bureau:

Number of horses and mules	81,459	
Number of cows	950	
Total number of horses, mules and cows	82,409	
Quantity of manure produced per head per day of 12 hours	40	lbs.
Total quantity produced per year within the city	601,585	tons

MARKET PLACES.

The littering of streets in tenement and manufacturing districts is a matter which can be greatly minimized by proper distribution of work and co-operation of the street cleaning forces and the residents. The quantity of street dirt collected from the pavements in market places, however, illustrates an instance where pavements become unavoidably littered.

It is necessary to keep the pavements of public market places as clean as possible on account of the number of people who walk over the streets while making their purchases. It is also important that the amount of street dirt and dust be reduced to a minimum to prevent it from blowing on to meats, vegetables and other produce. Owing to the congested condition of market places, it is necessary to do this work between the period of closing of market on one day and the time that teams begin to arrive the following day.

There are at the present time three market places in the city of Chicago:

1. Randolph market on Randolph street between Desplaines and Sangamon streets.
2. South Water street market on South Water, between State and Franklin streets and sections of intersecting streets lying between these streets.
3. Maxwell street market on Maxwell, between Jefferson and Halsted streets.

The cleaning of the South Water and Maxwell street markets is cared for by the city through cleaning at night and patrol service during the day.

In the case of the Randolph market a contract is entered into annually by the city with a private cleaning bureau and the work is done under the nominal supervision of the Ward Superintendent of the 18th Ward in which ward this market is located. The contract for the year 1913 called for the payment by the city of $5,000 for this service exclusive of special snow removal. It would appear that the work could be done more effectively and the standard of service raised by the city, as the work in this ward is now well planned and the ward has all the equipment necessary for such work. It is accordingly recommended that this work be done hereafter directly under the Superintendent and that the Superintendent be held strictly responsible for the cleanliness of this market as now required in the other two markets.

The estimated cost of cleaning the Randolph street market, which should be included in the 1914 appropriation for the 18th Ward, is as follows:

Labor—cleaning of roadway	$4,512.50	
Team hire—removal of dirt	1,721.50	
Total, exclusive of special snow removal		$6,234.00
Labor—special snow removal	$1,650.00	
Team hire—special snow removal	1,100.00	
Total—special snow removal		2,750.00
Grand total		$8,984.00

WHITEWASHING ALLEYS.

The whitewashing of alleys was successfully tried out several years ago in the densely populated districts in several sections of the city. These districts were usually entirely covered by buildings and these front on the alleys as well as on the streets. Under these conditions, the children of the tenements are forced to use the alleys as a common play ground.

In order to better bad housing and living conditions, the alleys in the congested districts should be whitewashed and provision for same should be made regularly for all wards in the city having such districts.

PRIVATE IMPROVEMENT ASSOCIATIONS.

As above indicated, standards for cleaning of streets and alleys in existence before the beginning of this investigation were generally based upon the amount of appropriations provided for the different wards, rather than upon a uniform standard obtained from a study of the actual needs and requirements of each section of the city. The appropriations which were made for the various wards in the past are shown in Table I and indicate that they were neither equitable nor uniform.

Because of this lack of uniformity and inequitable appropriations, the service in cleaning streets and alleys and other needs for the proper maintenance of highways have not been entirely satisfactory. Many private improvement associations have been organized whose function has been to keep a check on the work performed within certain sections of the city, and, in some cases, to supplement the service given by the city. Most of the improvement associations have, however, been principally concerned with the keeping of a general check on the manner and distribution of service by the Street Bureau.

The general opinion that these improvement associations expend large amounts of money in caring for streets and alleys, in addition to keeping a general check, does not appear to be well founded. Inquiries made relative to the service and expenditures of the associations which exist in different sections of the city indicate that within the last three years there have been in existence approximately 130 such organizations. Twelve of these reported the expenditure of $139,833.00, in amounts varying from $1,000 to $89,000.00 for street and alley cleaning and general improvements within their districts during the year 1911. These same associations reported the expenditure of $166,362.23 during the year 1912, of which the Citizens' Street Cleaning Bureau, which does work in part of the loop district, spent about $89,000.00.

The following is a list of the twelve largest associations from which replies were received:

1.	Citizens' Street Cleaning Bureau	1
2.	North Central Improvement Association	21
3.	Woodlawn Improvement Association	7
4.	South Park Improvement Association	6
5.	Hyde Park Improvement Association	6
6.	Charlevoix Improvement Association	6
7.	Hamilton Park Improvement Association	32
8.	Buena Park Citizens' Association	25

9. Washington Improvement Association, 1/3 in 6
   Washington Improvement Association, 2/3 in 3
10. Edgewater Improvement Association 25
11. Ravenswood Improvement Association 26
12. Stewart Avenue Improvement Association 7

These associations do much for neighborhood betterments by keeping check on general conditions obtaining in their districts through publicity and complaints. The existence of such associations indicates either that the work has not been uniformly distributed in the districts or that the residents of the section were not satisfied with the service given by the city.

The bases used in preparing the estimates of the ward appropriations for 1914, given in this report in Tables III and VI, were made on the assumption that all such work should be cared for uniformly throughout the city and the work performed by improvement associations was not considered as a factor. Where improvement associations are active they will in the future be performing this functeion on the basis of giving service to a particular section in addition to the uniform service provided by the city.

It has been proven by the installation of the new street cleaning schedules in all the wards during the past year that it is possible and practicable to obtain absolute uniformity and equity of service. Adherence to the general bases outlined in this report for equitable appropriations and uniform schedules will result in satisfactory and economical service in every section of the city. With such service, the improvement associations which are now carrying on such work will not be essential in so far as street cleaning and general waste collection are concerned. These functions should rightly and can be more economically performed by the street bureau, working under a definite and uniform system of service.

Investigation of the activities of the private associations indicates that unintelligent efforts in connection with some of their work is causing considerable damage to the city pavements, particularly the macadam and asphalt pavements. The practice of allowing these associations and teaming contractors employed by them unlimited free use of city water results in the flooding and consequent deterioration of city pavements.

If the people residing within the limits of an improvement association feel that the service given them by the city of Chicago is insufficient they could more effectively apply the money now used in sprinkling the streets for the prevention of the dust nuisance through oiling. Under all conditions such work of a private organization should conform to the regulations of the city Street Bureau, and in cases where sprinkling is necessary on hard pavements the wagons should be inspected and approved as to design by the Commissioner of Public Works and the quantity of water used be regulated so as to prevent damage and flooding of pavements.

CITIZENS' STREET CLEANING BUREAU.

The Citizens' Street Cleaning Bureau is an organization made up of property owners and business men who have interests in a part of the loop district in the First Ward. This bureau is engaged in the cleaning of streets and alleys, flushing, sprinkling, removal of snow, cleaning of sidewalks, cleaning of catch basins and removal of cinders. All but the last are confined within the district bounded as follows: Beginning at Michigan avenue, west on Congress street to State street, north on State street to Van Buren street, west on Van Buren street to Clark street, north on Clark street to Adams street, west on Adams street to La Salle street, on La Salle street from Jackson boulevard to Madison street, Madison street from La Salle street to Michigan avenue. Also State street from Madison street to the river, and the district included south and east of Washington and State streets, respectively, to Michigan avenue, which is now cared for by the South Park Commission. The bureau cleans approximately 119,000 square yards of streets and 20,000 square yards of alleys.

The organization of the bureau is as follows: One general manager who reports to a committee of property owners and contributors, one inspector for day work and one foreman for the night shift, who report on the work done each day to the general manager. The inspector and foreman have general supervision over about sixty laborers. Of these laborers, there is an average of forty-three men engaged in street cleaning.

The funds for the support of this bureau are secured mainly from four sources, as follows:

1. Annual appropriations by the city for the care of this district of the city.
2. Reimbursement by the street car companies for the cleaning of their right of way in streets of the district in which there are trolley lines.
3. Voluntary subscriptions by property owners and tenants in the district.
4. Sale of cinders collected from the buildings in the district.

The expenditures of the bureau for the years 1907-1912 for the various purposes have been furnished by the Citizens' Street Cleaning Bureau as follows:

	1907	1908	1909	1910	1911	1912
Administration	$11,031.71	$11,484.73	$11,178.39	$ 9,170.35	$13,347.72	$14,657.54
Cleaning of Streets	39,767.40	33,942.10	31,865.60	31,531.85	30,370.05	29,172.90
Cleaning of Alleys	3,581.35	3,404.50	3,379.00	2,917.03	3,450.90	3,485.90
Sweeping of Sidewalks						1,127.40
Cleaning Catch Basins						824.00
Carting Streets	7,756.85	7,501.25	7,620.65	7,674.25	5,936.46	6,399.00
Carting Alleys	1,457.80	1,830.20	1,687.80	690.05	766.75	813.00
Sprinkling and Flushing	640.00	670.00	720.00	2,051.70	2,840.10	6,464.00
Final Disposition					205.00	1,392.50
Snow Removal	11,343.34	14,244.44	14,875.00	11,680.25	10,450.95	24,430.15
Totals	$75,578.45	$73,077.22	$71,326.44	$65,715.48	$67,367.87	$88,766.39

During the past five years the city has each year appropriated $36,000 for the bureau for the cleaning and care of the streets and alleys within this district. The bureau has also received from the city approximately $18,000 each year, the amount which the street car companies have reimbursed for the cleaning of their rights-of-way in this district. The amounts over the $54,000 received from the city and the street railway companies have been obtained from voluntary subscription and the sale of cinders.

An estimate of the cost of cleaning the streets, alleys and sidewalks within the limits of the district now covered by the Citizens' Street Cleaning Bureau has been prepared on the same basis as the estimate of the appropriations for all such work to be done by the city during 1914 in that section of the First Ward north of Polk street. The figures which follow do not include the cost of cleaning catch basins, overhead charges, maintenance or new equipment or cost of disposition by freight:

Cleaning of streets—labor	$28,874.25
Cleaning of alleys—labor	2,112.75
Sunday patrol—labor	585.00
Cleaning of sidewalks—labor	1,408.50
Removal and disposal of street dirt—labor	2,817.00
Field supervision—labor	2,412.50
Removal of street dirt—teams	5,164.50
Operation of street flushers—teams	2,002.00
Total	$45,376.50
Special snow removal—labor and supervision	8,700.00
Hire of teams for snow removal	6,300.00
Total—special snow removal	$15,000.00
Grand Total	$60,376.50

Investigation of the methods used by this bureau indicates that the work is being done to the general satisfaction of property owners, tenants and the city.

The bureau is maintaining a high standard of cleanliness in the district covered by it and has an advantage over the city in being able to require and maintain high standards of work from the laborers employed on this work. With changes in employment conditions and methods cited in this report, the city should soon be in a position to do this work as economically and as well as any separate private institution. The people in this district would not then be required to pay extra amounts for service which should be provided by the municipality.

ESTIMATES FOR PAPER BURNERS.

Paper burners or handcart incinerators have been in regular use in the city for about two years and have proven satisfactory and economical. This service should be extended throughout the city. Street laborers, supplementing the regular street and alley cleaning, are assigned with these incinerators to definite routes in given section of a ward and cover their districts regularly picking up and burning all paper and other combustible materials found lying in the streets or alleys.

Inadaptability of these incinerators to large pieces of combustible matter often found in the alleys, such as mattresses, has required certain changes in the construction of the present type of portable incinerator and plans have been prepared to remedy this defect of the paper burner now in use and the defects are practically remedied. A plan of the proposed paper incinerator is shown in Plate VI. It will be noted that the proposed incinerator is set on a bracket about 6 inches above the axle to prevent the heat from warping the axle and wheels. It is also made sufficiently large that a bed mattress or any equally sized combustible materials may be thrown in and burned easily.

The following table represents the number of burners and the estimated appropriation for labor services recommended for this purpose in the various wards of the city for the year 1914:

Ward	Estimated No. of burners	Cost	Ward	Estimated No. of burners	Cost
1	2	$ 800.00	19	6	$2,400.00
2	8	3,200.00	20	7	2,800.00
3	4	1,600.00	21	1	400.00
4	4	1,600.00	22	4	1,600.00
5	4	1,600.00	23	2	800.00
6	4	1,600.00	24	4	1,600.00
7	3	1,200.00	25	2	800.00
8	4	1,600.00	26	1	400.00
9	1	400.00	27	1	400.00
10	6	2,400.00	28	4	1,600.00
11	4	1,600.00	29	4	1,600.00
12	3	1,200.00	30	4	1,600.00
13	4	1,600.00	31	2	800.00
14	4	1,600.00	32	2	800.00
15	4	1,600.00	33	1	400.00
16	3	1,200.00	34	3	1,200.00
17	4	1,600.00	35	3	1,200.00
18	4	1,600.00			
			Total	121	$48,400.00

This method of paper and combustible rubbish disposal is more economical than the removal of rubbish by wagons. This appropriation should be provided in addition to the regular appropriation for removal of rubbish. The labor engaged in operation of these paper burners will also be used in many districts of the city to assist in the collection of rubbish.

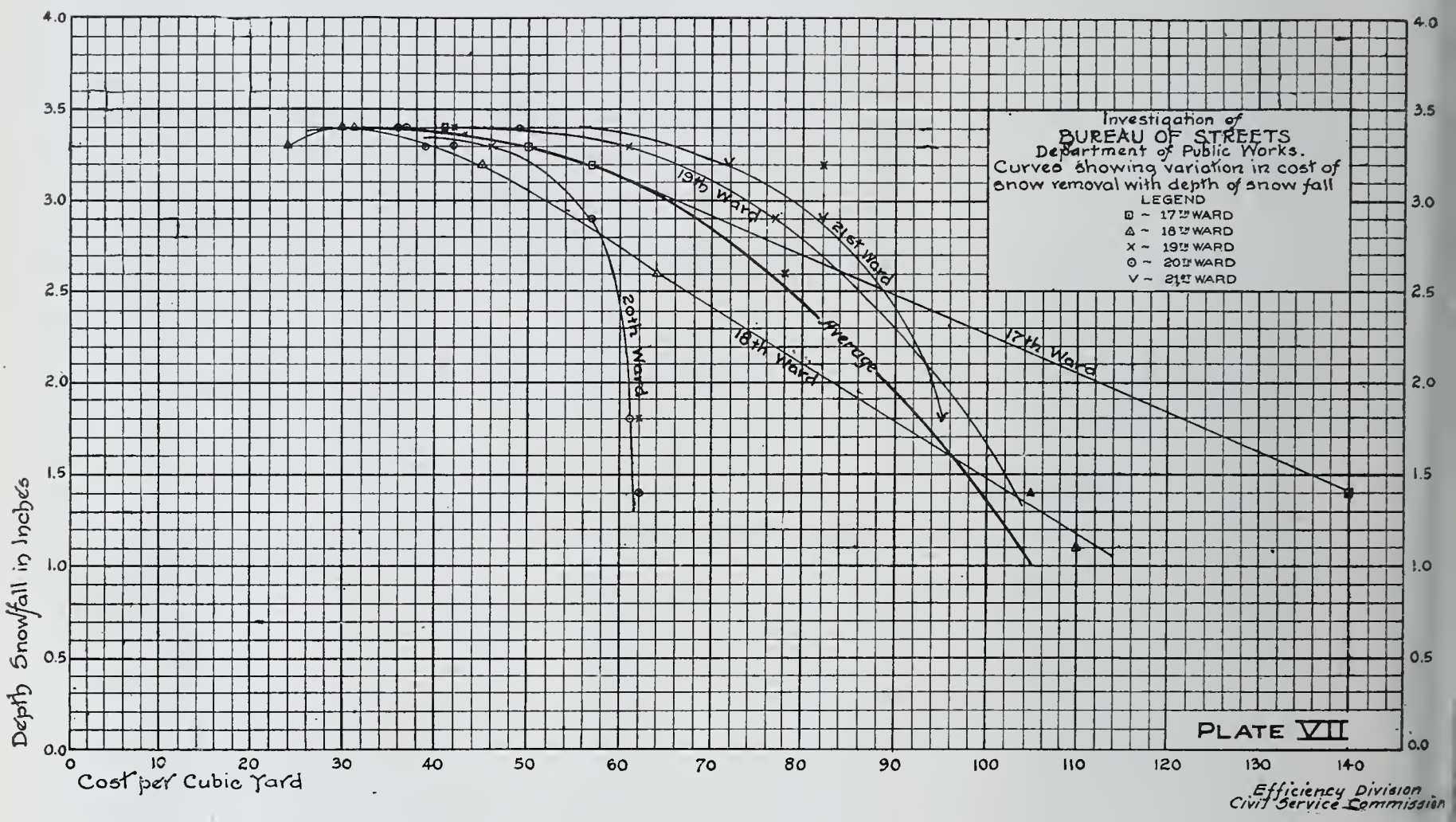
SPECIAL SNOW REMOVAL SERVICE.

The necessity for special appropriations for the removal of snow occurs only on those streets having heavy pedestrian or team and street railway traffic, and also where the congestion due to these greatly hampers business and disrupts the services

if the snow is not removed immediately.

In the course of the study of the traffic conditions in different parts of the city, data was collected as to the methods now used in the removal and disposition of snow. From this data a standard has been prepared upon which special appropriations for snow removal have been based.

In determining the amount of snow to be removed, the area between building lines has been used, as the snow from the sidewalks is shoveled into the streets. This area has been mutliplied by the estimated depth of snow to obtain the gross number of cubic yards which have fallen. Due to the compression of snow, either under traffic or its own weight, and to its melting, it has been found that the volume of snow to be removed is 18 per cent of the total volume as it falls to the ground. The curves shown on Plate VII indicate the variations in cost of snow removal with


Investigation of
BUREAU OF STREETS
Department of Public Works.
Curves showing variation in cost of snow removal with depth of snow fall
LEGEND
□ ~ 17th WARD
△ ~ 18th WARD
X ~ 19th WARD
○ ~ 20th WARD
V ~ 21st WARD
19th Ward
21st Ward
Average
18th Ward
20th Ward
17th Ward
PLATE VII
Depth Snowfall in Inches
Cost per Cubic Yard
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Efficiency Division
Civil Service Commission

depth of snowfall. It has been assumed that where the depth of snowfall is less than three inches, special removal will be made in no part of the city except that portion of the First Ward north of 12th street; also a snowfall of one inch or less in depth will not be removed in any part of the city by special forces, but will be cared for by the ordinary street cleaning forces.

Estimates for special snow removal service have been determined for all streets in all wards having the same cleaning service as the streets in the First Ward south of 12th street, and for all streets in the First Ward north of 12th street, irrespective of traffic. Those streets having traffic of over 2,000 vehicles per eight-hour day, or those streets which have street railway traffic in addition to 1,600 vehicles per eight-hour day, have been included in the estimate. In addition, a snowfall of more than 3-inch depth is removed by special laborers from all transfer corners. The unit costs for this work have been assumed to be the same as those given in Plate VII.

The different wards of the city for which a special snow removal service is recommended and estimates of special snow removal appropriations for 1914 are as follows:

ESTIMATED COST of CLEANING STREET CAR RIGHT of WAY BASED UPON ESTIMATE for STREET & ALLEY CLEANING for 1914, INCLUDING COST of SNOW REMOVAL

TABLE XVI — INVESTIGATION of BUREAU of STREETS — DEPARTMENT of PUBLIC WORKS

BOROUGHS	Cost of Cleaning Streets which are blocked for cleaning	Cost of Spring cleaning			Cost of cleaning Macadam pavement			Ordinary Winter Cleaning		Cost of Heavy Snow removal		Cost of Supervision	TOTAL		GRAND TOTAL	BOROUGHS
	Labor	Teams	Labor	Teams	Labor with Dirt teams	Labor	Teams	Labor with Dirt teams	Labor	Teams	Labor	Teams		Labor	Teams		
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	20935	5550	28	23	8				3676	1008	4503	5824	3015	32,165	12,405	44,570	1
2	3330	730	38	17	0	46	29	3	1122	247	563	387	470	5,580	1,410	6,990	2
3	3660	1290	48	92	14				1869	475	94	63	550	6,235	1,920	8,155	3
4	3510	430	69	26	6				1515	268	521	361	470	6,080	1,085	7,165	4
5	5280	720	88	29	6				1971	331			585	7,830	1,080	8,910	5
6	1955	650	41	60	6	31	20	2	635	115			250	2,920	845	3,765	6
7	2290	340	125	63	14	450	111	21	1120	206			335	4,355	720	5,075	7
8	2345	220	82	84	20	103	6	4	983	140			281	3,820	450	4,270	8
9	1235	400	513	151	36	291	19	18	587	95			235	2,915	665	3,580	9
10	2580	100	27	29	6				1310	348	617	433	385	4,925	910	5,835	10
11	4270	1400	61	43	12				1317	302			530	6190	1,745	7,935	11
12	1260	280	60	25	7	69	20	4	439	45			156	1,995	370	2,365	12
13	5340	1500	73	63	10				2022	557			680	8,125	2,120	10,245	13
14	4230	1220	52	71	8	500	196	23	1887	488			620	7,320	1,975	9,295	14
15	2970	900	48	53	8	89	42	4	1501	330			425	5,045	1,325	6,370	15
16	3460	1250	58	67	10				1237	398			465	5,230	1,715	6,945	16
17	3175	1790	32	34	4	333	188	16	1011	425	609	418	585	5,765	2,855	8,620	17
18	11410	3450	46	56	18	76	32	5	4172	1178	2738	1889	1805	20,270	6,605	26,875	18
19	5270	1420	47	16	6				1753	472	614	417	720	8,410	2,325	10,735	19
20	4020	1420	37	17	4				1060	320	1179	828	645	6,945	2,585	9,530	20
21	6730	2700	46	93	10				3460	1519	2054	1413	1310	13,610	5,725	19,335	21
22	9615	2770	53	116	15				1747	634			800	8,230	3,520	11,750	22
23	4730	1520	60	96	16				2470	579	944	675	800	9,020	2,870	11,890	23
24	3870	1000	63	41	11	127	44	8	1953	425			535	6,565	1,510	8,075	24
25	2720	600	115	86	19	61	19	4	937	170			335	4,190	875	5,065	25
26	6450	1280	116	63	18	65	17	4	1951	425			736	9340	1,785	11,125	26
27	3925	300	76	15	3	89	9	6	601	81			355	5,055	405	5,460	27
28	5180	1080	72	33	8				3165	712			725	9,150	1,825	10,975	28
29	2045	300	48	19	4	81	20	4	908	161			250	3340	500	3,840	29
30	3300	570	42	11	3	61	13	4	1405	276			400	5215	870	6,085	30
31	3920	750	59	37	6	92	28	6	1809	400			500	6390	1,215	7,605	31
32	3025	410	189	94	23	180	42	11	1037	189			365	4,830	735	5,565	32
33	2670	300	52	26	5	50	8	3	965	171			295	4,040	505	4,545	33
34	2195	490	121	58	15	23	7	1	1150	220			305	3,810	765	4,575	34
35	3550	770	127	83	15	50	15	3	1300	262			440	5485	1,130	6,615	35
TOTAL	152,450	39,890	2,801	1890	380	2,967	885	154	55,944	13,972	14436	12708	21,358	250,390	69,345	319,735	TOTAL

NOTES — The estimated cost of cleaning street railway right of way is based upon area and kind of pavement, the added difficulty of cleaning the right of way due to the presence of tracks, uniform standards of service for street cleaning schedules now in operation.

— Estimate does not include the cost of maintenance and interest on equipment and apparatus, the cost of supplies, superintendence, partial depreciation of street dirt, or other overhead charges

— The estimate for special snow removal is based upon giving this service to all streets having a traffic of 2000 vehicles or more per day of 8 hours

Efficiency Division — Civil Service Commission
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Special Snow Removal.

Ward	Labor and supervision	Team hire	Total estimate
1	$45,700	$32,000	$77,700
2	1,570	1,080	2,650
3	305	205	510
4	1,400	970	2,370
10	1,850	1,300	3,150
17	1,600	1,100	2,700
18	11,000	7,600	18,600
19	1,700	1,150	2,850
20	3,200	2,250	5,450
21	7,400	5,100	12,500
22	2,500	1,800	4,300
Citizens' Street Cleaning Bureau...	8,700	6,300	15,000
Total	$86.925	60,855	147,780
Total exclusive of Citizens' Street Cleaning Bureau...	78,225	54,555	132,780

CLEANING STREET CAR RIGHTS OF WAY

The city ordinances provide that persons or corporations operating railway tracks along the surface of any street shall clean their rights of way and remove entirely from such street all dirt, snow and accumulations in accordance with the ordinances of the city in relation to the cleaning of streets and to the rules and regulations of the Department of Public Works in that behalf. Under an agreement with the street railway companies this work has been done for a number of years by the Bureau of Streets and the city has been reimbursed for such services by the respective railway companies.

In the preparation of the schedules for street cleaning, this condition was taken into account and a special study made of the areas, condition of pavements and factors controlling the standard of cleaning required in the street railway rights of way throughout the city. The cleaning schedules which are now in use in the city provide that the same standard of cleanliness and service be maintained on the entire surface of the street, irrespective of the kind and condition of pavement on the street.

Where the pavement on rights of ways is different from that of the balance of the street, the cost of cleaning the right of way has been proportioned on the basis of the relative difficulty of cleaning the different kinds of pavement, as shown under the heading "Street Cleaning Factors and Standards," and the added difficulty due to the presence of tracks.

Estimates of the cost of cleaning and removing dirt from the street car right of way have been made on the above basis and have been proportioned among the different wards according to the uniform standard of service and schedules which are now in effect. The estimated cost of removing snow from the street car right of way for the streets for which a special snow removal appropriation is provided, has been proportioned on the ratio of the width of the right of way to the total width of the street. The above estimates are shown in Table XVI and do not include the proportional overhead charges and interest on cost and depreciation of equipment. It is estimated that approximately $30,000 will cover these and the total amount should be billed against the railway companies according to the services rendered.

CLASSIFICATION OF CITY'S WASTES.

The general classification of the city's wastes is at present defined in Section 992 of the revised City Code of 1910, as follows:

> "In the construction and application of this chapter, the word 'garbage' shall be taken to include any and all rejected or waste household food, offal.

swill and carrion. The word 'ashes' shall be taken to include all ashes of wood, coal, coke, and the residue resulting from the combustion of any material or substance, and soot, cinders, slag, and charcoal. The words 'miscellaneous waste' shall be taken to include dust, and all refuse, except excrement and dead animals and parts thereof, and also except all articles and substances herein included under 'garbage,' 'ashes' and 'manure.' The word 'manure' shall be taken to include the excrement of all domestic animals and fowls, and stable bedding, and all hay, straw, shavings, grass or leaves which have been used for stable bedding."

All references in this report to different kinds of waste in this city are in accordance with the classification given in the above section of the city ordinances.

In the course of the analysis of methods and cost of the disposition of municipal wastes in different cities of the country, the lack of uniformity in the classification of such wastes in each city was disclosed. Because of this lack of uniformity, it has been impossible to definitely ascertain the relative effectiveness and costs of the collection and disposal of these wastes. It would be highly desirable that a uniform classification be prepared by representative officials and adopted throughout this country. With the establishment of uniform classification and record systems, it will be possible to definitely ascertain relative costs and best methods in caring for these important municipal activities.

DEAD ANIMALS.

For a number of years a separate contract has been let by the city to a private corporation for the removal and disposition of all dead animals. This contract was renewed on August 13, 1912, for a period of five years, for which the city is paid an annual rate of $25.00. This contract provides that the contractor shall remove within twelve hours all dead animals from all streets, alleys and the river, except in the stock yards district, and have same disposed of not nearer than three miles outside of the city limits.

To obtain an estimate of the number and weight of dead animals removed and disposed of each year in the city, analysis has been made of the records on file in the Department of Health for the year ending August 1, 1913. A summary of same is given herewith, as follows:

Total number of dead horses, average weight 1,300 lbs.....	9,253	
Total number of dead dogs, average weight 25 lbs.....	20,782	
Total number of dead cats, average weight 5 lbs.....	3,603	
Total number of other animals, including, cows, goats, sheep, rabbits, etc., average weight 100 lbs.....	448	
Grand total number of dead animals removed.....	34,086	
Total estimated weight of all dead animals removed, 12,611,265 lbs., or	6,305	tons

It would be desirable that the contract for the disposal of garbage, if such a contract is hereafter made, should include in it the disposal of dead animals, and, particularly so, if the city is to have its own garbage disposal plant or have an interest in the revenue of its plant operated by a private corporation. This matter should be given further study before another contract for the collection and disposal of dead animals is let.

PRIVATE SCAVENGERS.

The city ordinances at the present time allow private scavengers to collect garbage and refuse in different sections of the city, after they have obtained a permit from the Department of Health. There are at the present time one hundred and twenty-six (126) private scavengers, who have licenses for the operation of approximately two hundred and two (202) wagons for the collection of garbage from different sections of the city. Each private scavenger is required to pay a license fee

of $5.00 for each wagon operated. Besides these, thirteen offal scavengers are operating two hundred and twenty-eight (228) wagons, for which each scavenger pays a total license fee of $50.00 annually, irrespective of the number of wagons used.

Most of the private garbage scavenger collection is done in the loop district, where garbage from hotels and restaurants is abundant and rich. These private scavengers deliver their garbage to rendering firms in different parts of the city. The records of the Department of Health shows that during the year 1913 the following number of rendering firms took out licenses to carry on this work:

Total number of companies to whom licenses have been issued.....	39
Total number of license tags issued.....	305
License fee required for rendering, packing meat for shipment.....	$300.00
License fee required for each rendering tank operated.....	$25.00
Total number of licenses issued for operation of tanks.....	305
Total number of soap-making firms licensed for 1913.....	18
License fee per firm.....	$150.00

In the course of the field study, many private scavengers were found who still retain their old wagons and collect and haul garbage in uncovered wagons, which are both unsanitary and offensive. Section 1007 of the City Code provides as follows:

> "Vehicles to be covered—Not to be overloaded—No person or corporation owning or controlling any cart or vehicle used for the purposes herein mentioned shall cause or permit any such cart or vehicle to be so loaded, or to be in such defective condition, or so out of order, or of such faulty construction, or to be so improperly driven or managed that any manure, garbage, rubbish, offal, dirt, offensive liquid or other material with which such cart or vehicle is loaded shall drop or fall upon or in any street, public way or other place; and such cart or vehicle and any box, can or other receptable carried thereon or therein and in which any of the substances described in this or the preceding section shall be carried, shall be so constructed as to be strong and practically air and water tight, so as to effectually prevent the same from emitting any odor and so as to prevent any part of the contents or load thereof from falling, leaking or spilling therefrom. . . ."

The inspection and supervision of private scavengers was found to be generally insufficient and no definite rules or regulations governing them appear to have been formulated.

DISPOSAL OF GARBAGE.

The problem of garbage disposal divides itself into four natural divisions, as follows:

1—House separation.
2—Collection.
3—Haul.
4—Final disposition.

The methods used for the final disposition of garbage are related with each of the other divisions, and any final solution of the methods to be used in the disposition of garbage should have reference to the conditions and methods used in the separation, collection and haul.

Study has been made of the details of the problems involved in garbage separation, collection and haul in this city through field investigation of conditions existing in every section of the city. Special reports to the number of about 320 have been prepared on the methods and conditions found throughout the city.

Garbage, which in this city consists of all rejected or waste household food, offal, swill and carrion, is separated from the ashes, manure and miscellaneous waste in all sections of the city, with the exception of two wards in the most southern part of the city, viz., the Eighth and Ninth, and part of the northwestern section of the city. The degree of separation in different sections varies to a great extent accord-

ing to character and density of population. Table VII shows the general character of separation in all sections of the city. Further education and the strict enforcement of the ordinance will bring about better separation of garbage and rubbish in the other sections.

The house collection is made by wagons equipped with covered steel tanks having a capacity of about two and one-half tons of garbage. The wagons and tanks are owned by the city, while the teams are hired from contractors on a per diem basis. Each ward is divided into garbage districts and collections are made from each district according to the density and character of population and district. The wagons are taken to the loading stations from which the tanks are transported to the place of final disposition. The frequency of garbage collection service is shown in Plate VIII and Table VIII.

The curves shown in Plates XI to XIV inclusive indicate the variation in the amounts of garbage collected and the problems which must be met in order to efficiently handle this work. These curves indicate that the minimum quantity is reached during the winter months, and the maximum quantity during the summer months, especially during the month of September. This necessitates that the organization maintained be flexible and easily adapted to the ever-changing conditions. Analysis of the garbage collections made in this city for the past five years indicates that the quantity to be collected from the several districts for different years is not a constant figure, depending upon the local conditions such as change of character of population, growth of residence, business or manufacturing property.

HAUL OF GARBAGE.

The question of the economy and sanitation of hauling garbage to the loading station and places of final disposition for long distances was considered in the determination of haul costs and in the routing of teams. In Tables VII and VIII are included the figures of the present service in the collection, haul and dumping of garbage in the different wards of the city and for the city as a whole.

Analysis of these figures indicates that the entire question of cost of disposition of garbage rests with the methods used in the garbage separation, collection and haul. This matter is one that is solved when the total costs and returns of disposal are available. The most economical haul for any section of the city can be determined by taking into account the total cost of collection and returns of disposal.

The figures included in Tables VII and VIII indicate clearly the possibility of further decreasing the garbage and refuse haul costs in this city. Provision of at least ten additional stations from which the refuse can be drawn either by motor trucks or by steam or street railway cars to places of final disposition, and the provision of a number of local disposal plants will greatly decrease these costs and allow better service throughout the city. The matter of loading stations and equipment are considered under the respective headings in the latter part of this report.

STANDARD FOR GARBAGE COLLECTION.

In the study of the collection and haul of garbage, special emphasis has been given to the need of providing uniform service throughout the city depending upon needs and requirements of every district. Regular collections are now being made in different districts laid out in accordance with this study and the service upon which the 1914 garbage collection and haul estimate has been prepared is shown in Plate VIII.

The estimates for 1914 ward appropriations are based upon uniform service for garbage collection. Service for garbage collection is dependent upon the following factors:

1—Congestion and character of population.
2—Character of housing conditions.
3—Quantity of garbage produced.
4—Death rate.

WARD CHARACTERISTICS, PRODUCTION & COMPARATIVE UNIT COSTS of COLLECTING, HAULING & DISPOSING of REFUSE for 1912

TABLE VII.

INVESTIGATION, BUREAU of STREETS – DEPARTMENT of PUBLIC WORKS.

ASH & RUBBISH COLLECTION, HAUL & DISPOSAL.

GARBAGE COLLECTION, HAUL & DISPOSAL

WARD	Area Square Miles	PRODUCTION: Minimum Month Cu Yds*	Maximum Month Cu Yds*	Total for Year Cu Yds*	Total Team Days	No. of Loads: Total	Avg per Team Day	Total Avg Time per Load	Place of Disposal	Avg Haul in Miles	Character of Separation	COST EXCLUSIVE OF OVERHEAD CHARGES: COLLECTION: Avg Time	% of Total Time	Cost	Avg Cost per Cu Yd	HAUL: Avg Time	% of Total Time	Cost	Avg Cost per Cu Yd	Avg Cost per Ton/Yd	DUMPING: Avg Time	% of Total Time	Cost	Avg Cost per Cu Yd	Total Avg Cost per Cu Yd	COST INCLUDING OVERHEAD CHARGES: COLLECTION: Cost	Avg Cost per Cu Yd	HAUL: Cost	Avg Cost per Cu Yd	Avg Cost per Ton/Yd	DUMPG & DISP: Cost	Avg Cost per Cu Yd	Total Cost	Total Avg Cost per Cu Yd*	WARD
1	3.09	3525	5813	56360	5793.00	11321	1.95	4.10	H	4.0	Fair	0.8	19.3	11873	.21	2.9	71.0	22600	.42	.05	0.4	9.7	3080	.05	37553	.66	12108	.21	23457	.42	.05	5617	.10	41182	.73	1
2	1.89	2353	7391	59514	5137.50	11161	2.17	5.70	B-H	4.2	Fair	0.3	6.2	5194	.09	3.0	81.0	23100	.39	.05	0.4	10.8	3080	.05	31374	.53	5332	.09	24769	.41	.05	5242	.09	35043	.59	2
3	2.00	1638	5213	44200	4446.50	8746	1.97	4.06	D-H	3.8	Fair	0.3	12.2	8306	.19	2.8	69.0	16850	.38	.05	0.4	9.8	2400	.05	26556	.60	8648	.20	17965	.41	.05	4418	.10	31031	.70	3
4	1.89	2201	3867	36231	2961.00	7203	2.43	3.29	B	3.5	Fair	0.3	8.9	4401	.11	2.6	79.0	12870	.36	.04	0.4	12.1	1970	.05	19241	.53	4524	.13	13959	.39	.06	3347	.09	21830	.61	4
5	6.80	1194	3060	24861	2158.50	4720	2.18	3.67	B	2.0	Poor	1.5	50.8	8545	.34	1.4	38.2	4540	.18	.05	0.4	11.0	1305	.05	14390	.58	9076	.36	9339	.38	.05	2323	.09	16340	.65	5
6	3.44	1701	4144	34304	3377.00	6299	1.87	4.28	B-E	4.5	Good	0.6	12.4	5425	.16	3.3	77.0	13650	.40	.05	0.4	9.4	1638	.05	20912	.61	5617	.16	14333	.44	.05	3157	.09	23709	.69	6
7	2.50	2680	4595	42271	4042.00	8271	2.04	3.92	E	4.5	Good	0.3	5.6	3638	.09	3.3	84.2	18780	.44	.05	0.4	10.2	2270	.05	24688	.58	3733	.09	20201	.48	.06	4122	.10	28056	.67	7
8	2.70	1925	3795	33510	2927.00	6569	2.24	3.57	L	1.7	No Separation	1.9	52.3	13589	.40	1.3	36.5	5830	.18	.05	0.4	11.2	1805	.05	21084	.63	14329	.43	6542	.20	.06	3215	.10	24086	.72	8
9	2.50	2619	3205	35071	3501.50	6920	1.97	4.06	E-M	2.0	No Separation	2.1	53.2	13720	.39	1.5	42.8	7140	.20	.05	0.4	9.8	1889	.05	22749	.65	14755	.42	7861	.22	.06	3520	.10	26136	.74	9
10	1.17	1378	3997	28850	6915	2.42	3.30	C-B	2.1	Poor	1.4	42.5	9281	.27	1.5	45.5	7150	.21	.05	0.4	12.0	1885	.05	18316	.53	9815	.29	1821	.35	.01	3246	.09	24882	.73	10
11	2.39	1318	6599	44373	4048.00	8987	2.20	3.63	J	2.0	Fair	1.8	44.6	9037	.36	1.5	106	5025	.20	.05	0.4	10.1	1335	.05	15399	.61	9629	.39	5519	.22	.06	2371	.10	17519	.71	11
12	2.63	1725	4805	38134	4031.50	7536	1.87	4.25	A	3.9	Fair	0.9	22.2	8974	.24	2.9	84	15050	.40	.05	0.4	11.0	2450	.05	23852	.58	6777	.15	17065	.39	.06	4307	.10	28149	.63	12
13	2.13	1779	5096	40270	3907.00	7918	2.03	3.94	A	3.3	Good	1.0	26.3	8175	.20	2.5	63.4	13250	.33	.05	0.4	10.1	2110	.05	26094	.68	9360	.25	16238	.43	.06	3914	.10	29512	.78	13
14	1.00	2080	3870	33807	3629.50	6428	1.82	4.38	A	4.5	Good	1.0	26.4	6675	.21	2.5	65.0	10500	.33	.05	0.4	10.4	1680	.05	18855	.58	8573	.27	14201	.45	.05	3887	.12	26661	.84	14
15	2.02	2074	6580	62497	5132.50	10626	2.08	3.84	C-B	2.5	Fair	1.1	40.1	6477	.13	3.4	175	15500	.46	.05	0.4	9.2	1840	.05	21817	.65	14681	.44	10731	.32	.05	3092	.10	21488	.67	15
16	1.05	2520	5668	48077	3938.25	9233	2.35	3.40	C-H	2.5	Fair	1.5	40.1	6932	.27	1.9	75.1	13950	.22	.05	0.4	10.4	2940	.05	33814	.54	17509	.28	12678	.36	.05	5138	.08	35380	.72	16
17	1.24	3616	5769	53150	3736.50	7712	2.06	3.57	C-B	2.5	Poor	1.1	32.2	10488	.22	1.9	56.0	12160	.25	.05	0.4	11.8	2560	.05	25208	.52	11018	.23	19204	.40	.02	4483	.09	34653	.72	17
18	2.06	3554	8155	71555	6635.50	13171	1.98	4.27	A-F	4.8	Good	1.3	35.5	10559	.15	1.9	53.8	10180	.13	.05	0.4	11.2	2140	.05	22879	.43	11104	.21	19751	.37	.01	3937	.06	34653	.72	18
19	1.50	2260	6005	43401	4647.50	8628	1.87	4.27	A-F	3.6	Good	0.3	6.6	4510	.06	3.4	84.0	36220	.51	.05	0.4	9.4	3940	.05	44671	.62	4650	.07	38059	.53	.06	7330	.10	50039	.70	19
20	1.95	2150	6573	52030	5259.00	10509	1.99	4.01	A-F	3.1	Good	1.2	27.2	9389	.21	2.7	63.4	10320	.38	.05	0.4	9.4	2420	.05	28128	.65	9882	.23	17473	.40	.06	4456	.10	31812	.73	20
21	2.06	1660	3789	39216	3808.00	7646	2.06	3.88	A	2.0	Good	1.3	32.5	12470	.24	2.3	57.5	16730	.32	.05	0.4	10.0	2912	.05	32112	.62	13068	.25	17789	.34	.05	5356	.10	36213	.69	21
22	5.13	1770	4414	38207	3580.00	7658	2.14	3.74	A-G	3.5	Good	2.0	51.1	13529	.34	1.5	38.6	8100	.21	.05	0.4	10.3	2160	.05	23789	.60	14378	.37	8738	.22	.06	3891	.10	27007	.69	22
23	3.00	1771	6810	49186	4121.00	9207	2.38	3.45	A	1.5	Good	0.7	19.7	6558	.17	2.6	96.0	13700	.36	.05	0.4	10.7	2108	.05	22346	.60	14378	.37	8738	.22	.06	3891	.10	27007	.69	23
24	2.00	1165	2381	19866	2028.50	4179	2.04	3.91	A	2.0	Good	1.8	53.6	15623	.32	1.2	34.8	7900	.16	.05	0.4	11.6	2430	.05	26158	.53	16705	.33	8339	.17	.06	4456	.09	29900	.59	24
25	2.16	1679	4170	36780	3605.00	7362	2.04	3.91	A	1.8	Good	2.1	53.4	9373	.40	1.5	38.4	4330	.22	.05	0.4	10.2	1150	.05	13353	.67	8395	.42	4716	.24	.06	2093	.10	15206	.76	25
26	1.12	1292	2783	25519	2421.00	4962	1.97	4.96	D	1.5	Fair	1.1	33.9	12818	.35	1.4	39.9	7120	.13	.05	0.4	10.2	2020	.05	22024	.60	13701	.37	7662	.21	.06	3679	.10	25042	.69	26
27	2.50	1670	4263	36593	3558.50	7231	2.03	3.94	D	2.1	Poor	2.5	68.6	10720	.42	1.2	29.6	3925	.15	.05	0.4	9.8	1307	.05	15972	.63	11542	.45	8347	.17	.06	2465	.10	18354	.72	27
28	2.44	1685	3765	34719	3508.50	6924	1.97	4.06	E-D	3.5	Good	1.1	26.2	8190	.24	2.6	68.0	7980	.22	.05	0.4	10.1	1978	.05	22003	.60	12802	.35	8608	.24	.06	3633	.10	25044	.68	28
29	12.35	1197	4116	32827	3231.00	6637	2.02	3.96	J	2.0	Good	2.7	65.6	19201	.44	1.0	24.0	5970	.14	.05	0.4	9.8	1890	.05	22424	.65	8592	.25	13321	.38	.05	3480	.10	25393	.73	29
30	4.06	1307	4929	35390	2885.75	7046	2.44	3.26	J	4.0	Fair	0.6	16.0	6850	.21	3.0	93.9	13500	.41	.05	0.4	9.9	2380	.05	27552	.63	20321	.47	6990	.15	.06	4362	.10	31673	.71	30
31	3.00	1771	6810	49186	4121.00	9207	2.38	3.45	A	1.5	Good	2.0	60.4	13890	.39	0.9	24.6	4360	.12	.05	0.4	10.2	1910	.05	22250	.60	7064	.22	14747	.45	.06	3349	.10	25160	.77	31
32	2.00	1165	2381	19866	2028.50	4179	2.04	3.91	A	2.0	Good	1.8	53.6	15623	.32	1.2	34.8	7900	.16	.05	0.4	11.6	2430	.05	26158	.53	16705	.33	8339	.17	.06	4456	.09	29900	.59	32
33	2.16	1679	4170	36780	3605.00	7362	2.04	3.91	A	1.8	Good	2.1	53.4	9373	.40	1.5	38.4	4330	.22	.05	0.4	10.2	1150	.05	13353	.67	8395	.42	4716	.24	.06	2093	.10	15206	.76	33
34	12.12	1292	2783	25519	2421.00	4962	1.97	4.96	D	1.5	Fair	1.1	33.9	12818	.35	1.4	39.9	7120	.13	.05	0.4	10.2	2020	.05	22024	.60	13701	.37	7662	.21	.06	3679	.10	25042	.69	34
35	2.50	1670	4263	36593	3558.50	7231	2.03	3.94	D	2.1	Poor	2.5	68.6	10720	.42	1.2	29.6	3925	.15	.05	0.4	9.8	1307	.05	15972	.63	11542	.45	8347	.17	.06	2465	.10	18354	.72	35
36	2.44	1685	3765	34719	3508.50	6924	1.97	4.06	E-D	3.5	Good	1.1	26.2	8190	.24	2.6	68.0	7980	.22	.05	0.4	10.1	1978	.05	22003	.60	12802	.35	8608	.24	.06	3633	.10	25044	.68	36
37	12.35	1197	4116	32827	3231.00	6637	2.02	3.96	J	2.0	Good	2.7	65.6	19201	.44	1.0	24.0	5970	.14	.05	0.4	9.8	1890	.05	22424	.65	8592	.25	13321	.38	.05	3480	.10	25393	.73	37
38	4.06	1307	4929	35390	2885.75	7046	2.44	3.26	J	4.0	Fair	0.6	16.0	6850	.21	3.0	93.9	13500	.41	.05	0.4	9.9	2380	.05	27552	.63	20321	.47	6990	.15	.06	4362	.10	31673	.71	38
39	3.00	1771	6810	49186	4121.00	9207	2.38	3.45	A	1.5	Good	2.0	60.4	13890	.39	0.9	24.6	4360	.12	.05	0.4	10.2	1910	.05	22250	.60	7064	.22	14747	.45	.06	3349	.10	25160	.77	39
‡	191.30	68023	166007	1393776	131475.00	271.760	2.06	3.91		4.0	Fair	1.7	47.5	2538	.15	3.0	76.5	12410	.41	.05	0.4	9.7	1660	.05	20199	.57	14398	.41	4590	.13	.05	3252	.09	22240	.63	‡
1	3.09	535	908	8306	1258.00	1246	.99	8.00	R	6.0	Fair	1.3	33.7	334,570	2.68	2.2	66.3	421,350	.30	.05	0.4	10.4	74352	.05	830,680	.59	352194	2.81	470,875	.38	.03	1138.29	.09	962898	.68	1
2	1.89	273	669	5757	2160.00	2149	.99	8.00	R	7.7	Fair	4.6	57.5	5898	2.19	3.0	37.6	2539	1.01	.12	0.4	5.0	346	.13	8818	3.43	6440	2.51	3118	1.22	.15	1381	.54	13939	429	2
3	2.00	229	581	4394	1915.00	1802	.99	8.00	R	8.7	Fair	5.6	70.0	10437	2.02	2.0	25.0	2982	0.58	.10	0.4	5.0	597	.12	14016	2.73	10950	2.12	6605	.78	.13	2697	.52	17233	334	3
4	1.58	169	340	3023	1481.00	1872	.99	8.00	R	2.0	Poor	4.9	61.3	8846	2.01	2.7	33.7	3370	0.77	.10	0.4	5.0	500	.11	12714	2.90	9461	2.15	4785	.93	.12	2310	.53	13856	361	4
5	3.44	214	498	3937	1613.00	1593	1.00	8.00	R	2.0	Poor	6.1	76.2	7477	2.97	1.5	18.8	1207	0.48	.12	0.4	5.0	408	.13	10685	3.53	9506	3.16	1976	.65	.16	1597	.53	13079	434	5
6	2.70	169	435	3283	1616.50	1352	.95	8.00	R	7.0	Good	4.0	50.0	6068	1.54	3.6	45.0	3992	1.01	.09	0.4	5.0	643	.11	10503	2.67	6548	1.67	4762	1.21	.11	2060	.52	13370	340	6
7	12.50										No Separation	32.4	40.0	4995	1.52	4.4	55.0	4395	1.34	.10	0.4	5.0	390	.12	9780	2.97	5365	1.63	5185	.58	.11	1767	.54	12315	373	7
8	1.17	115	325	2472	1193.50	1219	1.02	7.85	R	3.3	No Separation																								8
9	2.23	111	245	2155	880.50	993	1.12	7.85	R	3.0	Poor	5.0	63.3	6376	2.96	2.5	31.6	2075	0.88	.13	0.4	5.1	394	.13	8725	3.93	6816	3.05	2641	1.09	.16	1392	.53	10831	421	9
10	2.52	114	314	2490	1067.00	1057	.99	8.00	R	4.5	Poor	5.2	65.0	5437	2.57	2.3	29.1	1570	0.73	.12	0.4	5.1	275	.13	7282	3.38	5917	2.75	1373	.62	.13	1705	.58	9057	421	10
11	2.39	787	635	5115	2225.00	2347	1.06	7.58	E	4.1	Poor	4.3	53.7	4326	1.74	3.5	44.3	2540	0.89	.10	0.4	5.0	293	.12	7054	2.83	4764	1.92	2361	.95	.13	2380	.54	9055	365	11
12	4.43	153	460	3378	1471.00	1470	1.00	8.00	E	3.2	Fair	3.7	48.3	9458	1.84	3.5	46.0	5680	1.11	.12	0.4	5.3	649	.13	15787	3.09	10298	2.02	9466	1.85	.11	2787	.54	23551	461	12
13	2.13	247	624	4758	1884.00	2139	1.17	6.85	E	3.5	Fair	5.2	65.0	8103	2.40	2.4	30.0	2435	0.72	.11	0.4	5.0	405	.12	10943	3.26	8812	2.62	4702	1.40	.09	1790	.53	15504	462	13
14	1.15	147	360	2705	1252.00	1342	1.07	7.45	E	2.5	Good	3.9	56.5	8981	1.89	2.6	37.1	3910	0.82	.11	0.4	5.0	605	.12	13493	2.83	9645	2.03	7110	1.50	.10	2570	.54	19325	407	14
15	1.00	161	433	3574	1274.00	1667	1.31	6.10	Z	1.0	Good	4.9	60.4	8851	2.48	2.8	30.8	1839	0.68	.13	0.4	5.3	345	.13	10037	3.77	8499	3.19	3454	1.34	.09	1511	.56	13664	513	15
16	2.02	257	546	4391	2136.00	2265	1.05	7.61	Z	2.2	Fair	5.2	63.4	12664	2.80	1.7	22.4	2600	0.59	.13	0.4	5.3	616	.14	15880	3.62	13388	3.05	5308	1.23	.09	2429	.55	21197	483	16
17	1.08	129	358	2774	1136.00	1338	1.08	7.40	Z	2.5	Poor	5.2	70.3	7168	2.50	1.8	24.3	1650	0.60	.12	0.4	5.4	366	.13	9184	3.32	7608	2.84	3388	1.23	.08	2423	.53	21197	483	17
18	1.24	175	355	3106	1368.00	1567	.99	8.00	R	2.8	Poor	5.5	68.8	8520	2.56	2.7	32.5	2765	0.73	.13	0.4	5.0	432	.14	11217	3.61	9686	3.10	4490	1.44	.10	1515	.54	12905	465	18
19	2.05	202	442	3614	1568.00	1739	.99	8.00	R	2.8	Fair	5.5	68.8	8520	2.56	2.7	32.5	2765	0.73	.13	0.4	5.0	432	.14	11217	3.61	9686	3.10	4490	1.44	.10	1515	.54	15899	570	19
20	1.50	133	333	2595	1124.00	1326	1.16	6.77	Z	1.6	Good	5.7	78.0	10625	2.95	1.2	16.5	1432	0.39	.12	0.4	5.3	432	.14	11217	3.61	9686	3.10	4490	1.44	.10	1515	.54	16913	607	20
21	1.98	256	676	4873	2308.50	2351	1.02	7.85	R	1.0	Poor	5.4	79.4	8196	3.16	1.0	14.7	909	0.35	.12	0.4	5.4	364	.14	9469	3.65	8813	3.41	2543	.98	.08	1455	.56	12811	460	21
22	2.06	195	445	3597	1822.00	1878	1.00	8.00	C	2.6	Good	5.5	65.5	10317	2.16	2.0	25.5	3240	0.67	.13	0.4	5.3	642	.13	14264	2.96	11780	2.32	6633	1.38	.06	2606	.54	20419	424	22
23	5.13	294	612	4911	2453.50	2855	1.00	8.00	C	4.2	Good	6.7	83.7	10032	2.84	0.9	11.3	1133	0.32	.14	0.4	5.0	372	.13	11687	3.31	11006	3.15	3511	1.00	.05	1984	.56	16501	471	23
24	9.00	290	620	5010	2120.00	2461	1.16	6.88	C	3.5	Good	4.3	53.8	9074	1.88	3.3	41.2	5575	1.13	.13	0.4	5.0	676	.13	15743	3.19	13073	2.65	9349	1.91	.08	2703	.55	21952	449	24
25	2.00	122	300	2676	1260.00	1266	1.06	7.58	C	3.3	Good	4.8	63.2	5933	2.39	2.4	31.6	2082	0.86	.13	0.4	5.2	343	.14	8363	3.38	6456	2.60	3932	1.59	.07	1586	.53	11772	476	25
26	2.16	171	418	3276	1615.00	1808	.99	8.00	C	4.5	Good	6.8	83.2	9890	3.91	1.1	13.5	1389	0.42	.14	0.4	5.0	502	.15	11781	3.60	10564	3.32	3682	1.03	.06	1492	.57	16430	502	26
27	1.12	111	233	2053	949.00	1041	.99	8.00	C	4.0	Fair	6.5	81.2	9890	3.91	1.1	13.5	1389	0.42	.14	0.4	5.0	359	.13	7165	2.68	5401	2.10	2234	1.11	.14	1103	.55	8740	436	27
28	1.24	188	512	3963	1627.00	1610	.99	8.00	C	4.0	Fair	4.4	57.5	6946	2.40	2.6	33.5	2150	0.74	.12	0.4	5.0	502	.15	11781	3.60	10564	3.32	3682	1.03	.06	1492	.57	16430	502	28
29	1.39	216	547	4634	2150.00	2131	.99	8.00	C	3.0	Fair	5.2	61.0	8680	2.19	2.4	30.0	2681	0.68	.12	0.4	5.0	539	.13	7165	2.68	5401	2.10	2234	1.11	.14	1103	.55	8740	436	29
30	12.35	214	573	4697	2136.00	2125	.99	8.00	R	6.0	Fair	5.0	62.5	10670	2.27	2.2	27.5	3850	0.82	.12	0.4	5.0	447	.11	11808	2.99	9404	2.39	3341	.85	.14	2072	.52	14897	380	30
31	4.06	137	436	3185	1477.00	1478	1.00	8.00	O-Z	5.0	Fair	3.5	43.7	8365	1.92	4.1	51.3	6030	1.38	.12	0.4	5.0	390	.13	15110	3.22	11657	2.50	4716	1.01	.14	2516	.54	18883	405	31
32	2.50	231	528	4229	2094.00	2082	.99	8.00	R	5.5	Fair	3.5	43.7	5980	1.88	4.1	51.3	4020	1.27	.12	0.4	5.0	262	.13	14382	3.48	8938	2.05	7025	1.62	.13	2413	.55	18426	422	32
‡	191.30	62356	149360	1139176	941520	560401	1.04	7.75		3.4		4.8	62.9	247800	2.24	2.5	32.0	271557	0.81	.12	0.4	5.2	15462	.13	380353	3.19	290048	2.46	154923	1.30	.10	64889	.54	510278	429	‡

A - Western & Addison
B - 43rd & Oakley
C - 47th & Loomis
D - 63th & Oakley
E - 43rd & Sherridan
F - Lincoln Park
G - Devon & Lake Michigan
H - 31st & Western
I - 34th & Lawndale
K - 39th & Lake Michigan
L - 95th & Yates
M - 92nd & Lake Calumet
O - Oakley & Chicago River
P - Chicago Ravenswood Plant
Z - Chicago Ry & Chicago River

* The unit used for garbage collection, hauling & disposal is the ton. ‡ Totals & Averages.

Cost exclusive of overhead charges is based upon the items expenditures as shown by the City Comptroller's Annual Report for 1912. The cost of collection includes all labor charges for this service, and the cost of team hire for the time spent hauling. The cost of haul includes the cost of team hire for the time spent hauling. The length of haul shown is the distance one way to the place of disposal. Average rate of travel assumed at 2.5 miles per hour. The cost of dumping is based upon the average period taken 1½ minutes per load.

Overhead charges include the cost of depreciation of equipment, rental, superintendence and operation of dumps and general stables expenditures.

The cost of collection, haul and disposal in percentage of dumps and disposal charged against haul cost of garbage charges have been prorated between collection, haul and disposal on basis cost of operation of loading stations, dumps and haul.

? Efficiency Division - Civil Service Commission - Sept 1913

ESTIMATES & CHARACTERISTICS BY WARDS for RUBBISH, ASH & GARBAGE SERVICE ~ 1914

TABLE VIII — INVESTIGATION of BUREAU of STREETS ~ DEPARTMENT of PUBLIC WORKS ~ ACTUAL CONDITIONS.

WARD	Area Square Miles	CHARACTER of POPULATION %															RUBBISH & ASHES																				GARBAGE																				WARD
		American	German	Irish	Italian	Polish	Russian	Dutch	Scandinavian	Bohemian	Hungarian	Colored	Austrian	Lithuanian	Others	Yardage per Month				Place of Disposal	Mileage Haul Miles	Service given per week				Labor Paper Burner	Supervision & Inspection	Total Cost Collecting & Hauling	% of Total	Tonnage per Month				Service given per week																				
																Maximum	Minimum	Total Estimate Yardage 1914			Present 1913		Proposed 1914							Maximum	Minimum	Total Tonnage 1914	Place of Loading	Mileage Haul Miles	Present 1913		Propose 1914		Supervision	Average Combined Cost Collecting & Hauling	Total Cost of Collecting and Hauling	% of Total	
																					Winter	Summer	Winter	Summer												Winter	Summer	Winter	Summer					
1	2.02	2	7	4	38		3		2						4	5480	3900	56230	A-B	4.4	6	6	6	6	800	2700	35000	36	227	215	2656	R	4.0	6	6	6	6	660	351	9310	6.1	1
2	1.09	49	8	4	2		6		3						23	5	6950	2640	58860	A	12	1-2	1	3	6	3200	2600	37200	38	169	272	5983	R	2.5	6	6	6	6	1010	284	15260	35	2
3	1.58	32	23	9	3	19	5		2	2			1	4	2	4100	1710	34490	D	3.7	2	3	3	3	1600	1800	25000	26	360	197	3378	R	2.0	2	3	3	3	940	308	14400	33	3
4	1.50	37	23	14		10	2		2				1	8	3	3010	1460	26600	D	17	2	2	2-3	2-6	1600	1150	16400	17	328	167	2929	R	2.0	2	3	3	3	860	322	10850	25	4
5	3.64	70	13	4			3		4				1		5	3820	1835	33590	F-G	0.37	2	1	3	3	1600	1750	24000	25	461	269	4095	R	5.5	2	3	3	3	845	342	10200	23	5
6	5.22	68	8	8			2		9						3	4780	2680	43850	E-G	3.0	2	3	3	3	1600	2050	27900	29	478	213	3742	R	7.0	2-3	3	3	3	910	307	11500	26	6
7	2.70	25	11	4	2	32	4		12		1		7		2	5160	2620	47230	H	22	2	3-2	2	6-3	1600	2000	27350	28	No Separation																										8
8	2.25	30	10	3	1	4	4	14	15		4		4		4	3980	3310	43480	6-1	20	1	1	2	2	400	2100	27350	28	No Separation																										9
9	1.17	6	4	1	3	32	3		40	1			4		6	4000	1980	36855	D-J	2.7	2-3	3	3	6	2400	1650	23800	24	311	168	2652	R	3.2	2	6	6	6	1165	315	11000	23	10
10	2.23	14	14	3	2	23	18		1	17			4	1	3	3865	1980	32110	D-J	20	6	6	3	6	2000	1325	19400	20	318	129	2702	R	3.0	6	6	6	6	985	360	9760	22	11
11	2.92	22	8	1		13	5		2	45			1		3	4450	1490	33210	K	1.9	3	2	3	3	1200	1350	18700	19	426	159	3493	R	4.5	2-3	3	3	3	860	312	10890	25	12
12	2.63	49	13	6	9	3	2		6		1	7	3		3	6860	2200	50840	E-K	35	1-2	1	3	3	1600	2360	32160	32	750	266	6071	Z	4.7	2	2	3	3	1020	238	17500	40	13
13	2.13	23	28	11		6	23		10	1	3		3		2	5120	2510	43280	L	37	1	1	3	3	1600	2150	29000	30	713	307	5755	Z	3.5	2	2	3	3-6	1090	293	16830	38	14
14	1.13	8	12			69	6			1			2		2	3500	1820	31970	L	3.8	2-3	2-3	3	3-6	1200	1480	20280	21	326	131	3023	Z	2.5	3-6	3-6	3-6	3-6	840	336	10150	23	15
15	1.09	9	7		13	43	3		2		2		9		2	3720	2240	33760	L	4.8	1	1	3	3	1600	1950	26900	28	390	179	3541	Z	1.0	6	6	6	6	830	291	10300	23	16
16	2.02	46	7	1		28	1						1		3	6975	2740	57110	J-K	3.5	2	3	3	3-6	1600	2750	37000	38	594	247	4451	Z	2.5	2-3	6	3-6	6	1020	340	15170	35	17
17	1.08	13	3	5	46	1	27						1		3	5675	2520	48260	J	1.5	2-3	2	3	6	2400	1900	27200	28	325	181	2858	Z	2.5	2-3	3-6	6	6	860	350	10100	23	18
18	1.24	10	6	1	5	5	54			2			13		1	4995	2735	47780	J-B	2.3	2-3	3	3	6	2600	2010	29000	30	306	157	2877	R	3.4	3	4-5	6	6	860	352	10100	23	19
19	2.05	53	15	10	6		2		9				1		4	7505	4540	70130	L	4.6	3	3	3	3-6	1600	3750	47850	49	442	214	3805	Z	1.5	3	6	3-6	3-6	860	320	12150	28	21
20	1.59	22	24	3	3	9	1		2		8		4		2	6005	2355	47040	L	3.8	2	3	3	3-6	1600	2400	32500	33	300	149	2968	Z	1.0	2	3	3-6	3-6	970	311	8990	20	22
21	1.98	50	28	3			1		13						5	6840	3085	56810	L	2.9	1	1	3	3	800	2150	36000	37	562	250	4984	O	3.0	2	2	3	3	1115	311	15500	35	23
22	2.06	36	25	2		3	1		4		2		1		4	6130	2500	45530	L	2.2	3	2	3	3	1600	2160	29260	30	508	199	4185	O	1.0	2	2-3	3	3	935	287	12000	27	24
23	5.13	58	20	2						17					3	5360	2850	48220	E-L	3.2	2	2	3	3	800	2100	29000	29	770	339	6119	O	4.5	2	2	3	3	1420	319	19500	44	25
24	9.60	43	31	2						20					4	6400	3620	55800	L	2.0	1	1	3	3	400	2300	30500	31	744	336	6188	O	3.5	2	2	3	3	1155	283	17500	40	26
25	2.06	23	27	1		22	2		15	2			1		2	4050	2470	34870	E-L	2.3	3	2-3	3	3	400	1500	20000	21	435	168	3624	O	3.5	1	2	3	3	878	381	14300	33	27
26	2.10	25	22	1		26	3		19				1		4	6280	2340	39070	L	2.2	3	2	3	3	1600	1850	25600	26	476	164	3910	O	1.5	2	2	3	3	915	302	11800	27	28
27	12.12	64	20	6	2	11	3		3	10	1		4	12	2	3230	1810	29840	E-D	2.1	2	2	3	1-6	1600	1500	20960	22	350	150	3112	R	4.0	2	2	3	3	950	345	10700	24	29
28	2.59	34	10	3	6	2	2	1	3	11	1	1	13	1	2	4605	2305	39300	E-D	2.1	1-2	1	3	3-6	1600	1750	24500	25	459	239	4121	R	3.0	3	3	3	3-6	930	332	13700	31	30
29	2.44	45	12	18			2		16				2		4	4720	2700	44060	E-D	2.6	1-2	1	3	3	800	2075	27850	29	700	295	5973	R	3.5	1	2	3	3	1110	304	18170	41	31
30	2.35	41	19	2	1	3			29		1		1		3	5380	2800	55000	E-G	2.0	2	2	3	3	800	2630	34290	35	700	267	5481	R	6.0	1-2	2	3	3	990	327	17350	39	32
31	2.36	37	11	4		1	13		1	31			3		2	4360	2240	42230	E-L	3.9	1	1	3	2	400	2100	27500	28	593	290	5353	O	3.2	2	2	3	3	1200	319	17100	39	33
32	2.62	42	16	16	1		1		1	1			2		3	5340	1845	42729	E-M	1.7	2-3	2	3	2	1200	1700	23100	24	523	203	4020	R	5.5	1-2	2	3	3	920	338	13500	31	34
33	1.91														2	4860	2600	39560	E-M	3.0	1-2	1	3	2	1200	1780	23680	24	633	250	5304	Z	5.0	1	2	3	3	1210	330	17500	40	35
34	1.91															49825	26800	1538000		28					45800	21720	973,020	100	16318	7201	87071		3.2					3281	907	139,380	100	34

NOTES

A- 27th St & Lake Michigan
B- 31st St & Western Ave
C- 39th St & Lake Michigan
D- 46th St & Oakley Ave
E- Alley in Ward

F- 51st St & Lake Michigan
G- 63rd St & Stewart Ave
H- 95th St & Yates Ave
I- 103rd St & Lake Calumet
J- 15th Pl & Loomis St
K- 33rd St & Kedzie Ave

L- Grace St & Campbell Ave
M- 33rd St & Lawndale Ave
O- Oakley Ave & Chicago River
P- Chicago Production Plant or 31st Street & Chicago River
Z- Chicago Ave & Chicago River

Cost of Superintendence, depreciation interest charges not included in above. Column 3 includes Americans, Canadians & Englisn. Column 10 includes Danish, Norwegians & Swedish

Nationalities not specifically shown
20th Ward - Roumanians 3%
29th Ward - Croatians 2%
31st Ward - Scotch 1%
7th, 13th, 32nd & 35th Wards - Scotch 2%
19th Ward - Roumanians 1%

Efficiency Division
Civil Service Commission

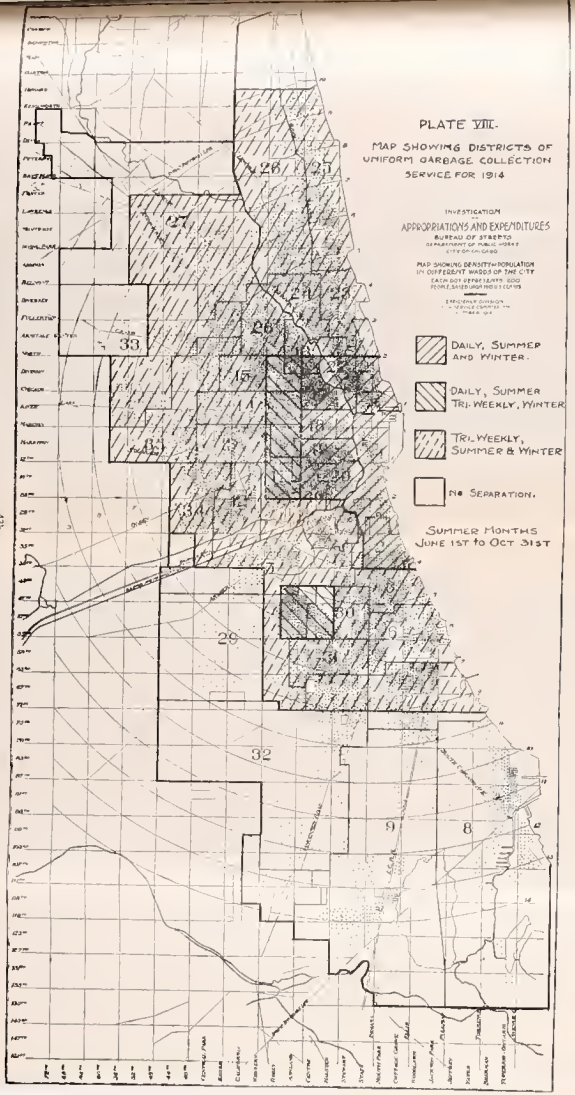


PLATE VIII.
MAP SHOWING DISTRICTS OF UNIFORM GARBAGE COLLECTION SERVICE FOR 1914
INVESTIGATION
APPROPRIATIONS AND EXPENDITURES
BUREAU OF STREETS
DEPARTMENT OF PUBLIC WORKS
CITY OF NEW YORK
MAP SHOWING DENSITY OF POPULATION IN DIFFERENT WARDS OF THE CITY EACH DOT REPRESENTS 500 PEOPLE, BASED UPON 1910 CENSUS
EFFICIENCY DIVISION
DAILY, SUMMER AND WINTER.
DAILY, SUMMER TRI-WEEKLY, WINTER
TRI-WEEKLY, SUMMER & WINTER
NO SEPARATION.
SUMMER MONTHS JUNE 1ST TO OCT 31ST

Plate VIII shows districts of uniform service based upon the foregoing factors intended to produce as nearly ideal conditions as are practical at the present time.

The tendencies and natural laws which determine the amount of rubbish which is collected from different sections of the city obtain also in connection with garbage collection. On a basis of these tendencies and the conditions existing in each ward, the tonnage of garbage has been estimated for 1914, as shown in detail in Plate VIII and Table VIII. Table VIII shows the garbage conditions and characteristics for previous years, and the standards of service and unit costs of collection and haul which have been used for the 1914 estimate of garbage appropriation. It has been found that wards lying the same distance from the center of the city, which have the same character and density of population, and having other similar conditions, give about the same tonnage of garbage per load.

Field study of the average time required by drivers to collect a load of garbage indicates that it takes about three hours and fifty-five minutes to collect a full load of garbage in summer and four hours and forty-one minutes to collect a full load of garbage in the winter months. These units have been taken as standards and represent service which can be secured and maintained by every efficient teamster in the city. In the few outlying wards where conditions are different, exceptions and allowances have been made in preparing the estimates for 1914. The average rate of haul has been found to be approximately 2.70 miles per hour and this figure has been used in calculating the time spent and cost of hauling garbage.

The estimates for garbage service for 1914 have been prepared on the basis that all garbage wagons will dispose of their loads at the Chicago avenue station, the Oakley avenue station or in the vicinity of a loading station or plant at 31st street and the Chicago River, the wagons from each district unloading at one of the above stations throughout the year as shown in Table VIII.

The estimates for the appropriation for garbage service in the different wards have been prepared on the assumption that the cost of removing a load of garbage in 1914 will be the same as the cost in 1913, and the number of loads to be collected will be in accordance with the schedules of service which have been based on the needs and requirements of each district as shown in Plate VIII. These estimates for ward appropriations are included in Table III.

A summary of the garbage collection standard which has been used in estimating the appropriations for this activity follows:

Standard collection time per load, summer.....3 hrs. 55 mins.
Standard collection time per load, winter.....4 hrs. 41 mins.
Standard rate per hour of team travel, summer and winter..2.70 miles.

Table VIII gives estimated quantities and haul.

RECEPTACLES FOR HOUSEHOLD WASTES.

The present city ordinances are definite in stipulating the manner in which household refuse should be separated, the manner in which same should be kept in receptacles and the character and number of vessels necessary for different classes of buildings. It has been found, however, that many residents in all sections of the city, and particularly in the densely populated districts, do not separate waste as specified, nor are receptacles provided in accordance with the ordinances. The former is due, perhaps, more to lack of knowledge of these ordinances and lack of appreciation of the resulting bad effects, than to the desire to violate the ordinances. It has also been ascertained that in many cases the tenants are either too poor to furnish the proper vessels, or where they have purchased them, same have either been lost in moving or have been stolen.

Section 995 of the present City Code defines the responsibility for furnishing of refuse cans for houses, buildings, apartments, flats and tenements as follows:

> "It shall be the duty of every owner or his agent or occupant of any house, building, flat, apartment, or tenement in the city of Chicago where persons reside, board, or lodge, or where animal or vegetable food is prepared or served, and which is a private residence, to provide for such house, building, flat, apartment, or tenement, and at all times to maintain in good order and repair, a separate vessel or vessels for garbage, and a separate vessel or vessels for ashes and miscellaneous waste, of the material, construction and capacity prescribed in section 996 of this article. . . ."

The above section is specific in the requirement of the provision of receptacles for household wastes and every means should be used by the street bureau, with the co-operation of the Department of Police, the City Prosecutor of the Law Department and the Department of Health, in having same provided. With the provision of receptacles, there will be better separation of garbage and rubbish and an increase in the economy in the collection of both. The uniforming of the drivers and section foreman who generally are sent out to enforce this ordinance will have a good effect on a large number of householders.

TRANSPORTATION OF GARBAGE BY BARGES.

All garbage which is collected from the north and west parts of the city is delivered either to the Chicago avenue loading station or the Oakley avenue loading station, each of which is located on the north branch of the Chicago River. Previous to the expiration of the contract with the Chicago Reduction Company this garbage was transported by the barges to the reduction plant at Thirty-ninth and Iron streets; since then, the barges have been sent to the temporary unloading dock on the river near the garbage dump at Grace street and Western avenue.

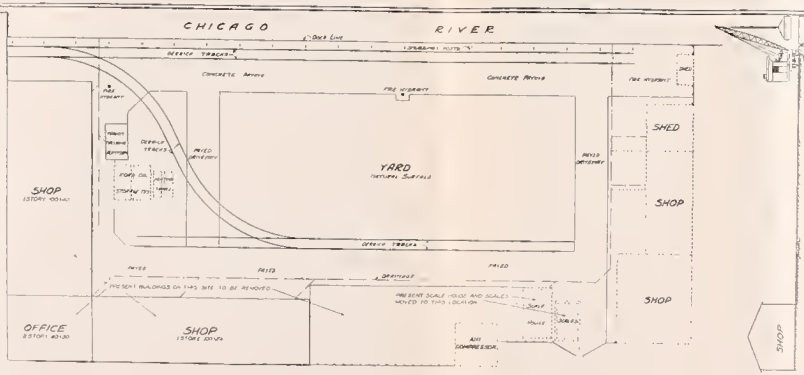
The garbage delivered to the above two stations constitutes about 60 per cent of the total collected in the city. The demand made upon the capacity of these loading stations is illustrated by the following: During the month of August, 1913, which was one of the heaviest months of the year, a maximum number of 110 tanks was delivered on one day, at the Chicago avenue loading station, and the average number of tanks delivered for the same month was 68 per day. The maximum number of tanks delivered on any day in August, 1913, at the Oakley avenue station was 64, and the average number was 51 per day. The delivery to these loading stations during January, which is the minimum month of production, shows that the maximum daily delivery at the Chicago avenue station was 63 tanks, and that at Oakley avenue station 41 tanks.

The Royal Lighterage Company has the contract for transportation from these loading stations and the present contract is made on a per diem basis at the rate of $81.45 for each working day. During the year of 1912 the cost of operation, maintenance, and lighterage of garbage delivered to the Oakley avenue station averaged about 80 cents per ton. The cost of operation, maintenance, and lighterage chargeable against the garbage delivered to the Chicago avenue loading station averaged about 65 cents per ton during the same period.

The equipment now furnished is neither modern or adequate, and the service furnished is not commensurate with the contract price. Study of the cost and character of the service rendered, and the cost of building and maintaining a fleet by the city for this purpose, indicates clearly that it would be a desirable and profitable venture for the city. It has been found that a tug, ample for this service, may be obtained approximately for $32,500, and that two suitable scows can be purchased for a total of $15,000. The cost of operating a fleet of boats under the present contract costs the city approximately $25,500 on a basis of 313 working days per year. It will be seen from this that the initial cost of the tug and scows would be returned to the city within a period of two years.

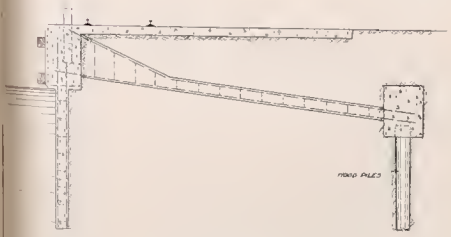
Interest and cost of maintenance and depreciation of the proposed city fleet has been summarized as follows:

PLATE IX.

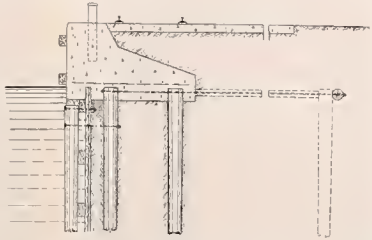


GENERAL LAYOUT
OF
PROPOSED DOCK, SHOPS, & YARD.
AT
CHICAGO AVENUE & CHICAGO RIVER

TYPICAL SECTION THRU YARD.



SECTION OF
REINFORCED CONCRETE DOCK.
SCALE 1/8"=1'-0"



CROSS SECTION of CONCRETE DOCK.
SCALE 1/4"=1'-0"

INVESTIGATION OF
BUREAU OF STREETS
DEPARTMENT OF PUBLIC WORKS
CITY OF CHICAGO

Efficiency Division Civil Service Commission. Sept. 1913

Cost of tug ($32,500).			
Interest on tug at 5%			$ 1,625.00
Fuel for operation of tug per year			3,460.00
Supplies for tug			1,080.00
Insurance per annum			200.00
Repairs			4,350.00
Depreciation, 5%			1,625.00
Salaries and Wages of Crew—			
Captain	$165.00	per month	
Engineer	120.00	per month	
Two firemen, at	65.00	per month	
One deckhand	65.00	per month	
Two scowmen, at	65.00	per month	
			7,320.00
Total cost of operating tug per annum			$19,660.00
Cost of two scows ($15,000).			
Interest on initial cost at 5%			$ 750.00
Depreciation at 7%			1,050.00
Repairs			1,000.00
Total cost of operating scows			$ 2,800.00
Total cost of operating tug			19,660.00
Grand Total—Cost, interest, maintenance, and depreciation of fleet			$22,460.00
Present cost of operating fleet of boats on the basis of 313 days per year			$25,500.00
Estimated cost of operating a municipally owned fleet			22,460.00
Estimated saving			3,040.00
Per cent saving			12%

CHICAGO AVENUE LOADING STATION.

The precent Chicago avenue garbage loading station has deteriorated to a point where it is necessary to make many alterations, and to generally rehabilitate the entire platform and shops adjoining the station. The cost of rehabilitating the platform would not only be greater than the interest on the cost of a sanitary and permanent station, but the rehabilitated station will require continual repair and changes, due to new requirements.

The construction of a permanent dock, which would admit of frequent washing and flushing, and a re-arragement of the yard and the scrapping of old material which accumulates at this station, will do much toward eliminating the present unsightly condition, and will increase the sanitary condition of the platform. Study was made of stations and docks in this city and other cities, and it was found that docks constructed within the last few years are of concrete, and so planned as to provide for the economical and sanitary hauling of the materials taken to and from the platform.

Plate IX shows an improved layout for a loading station which would be adaptable to any site on the Chicago River. The plan contemplates the use of either a re-enforced concrete dock or a combination concrete and timber dock, as shown in Plate IX. The general layout as adapted to the Chicago avenue site contemplates the use of yard trackage for the utilization of a traveling derrick to its fullest capacity. When the derrick is not in use for loading and unloading garbage tanks from the scows, it can be used for hauling materials and equipment in the storage yard and repair shops. A suggested layout of the shops is given on the plan above referred to, together with the layout for drainage, water supply, etc., which will be necessary to make the operation and sanitation of the station effective. It is estimated that the cost of this concrete platform and re-arrangement of repair shops and offices will be approximately $38,850, which amount should be provided for in the budget for 1914 in order that the new platform may be ready for use during the busy summer season of 1914.

The details of the estimates follow:

Estimated cost of 310 feet combination wood and concrete dock..	$12,400.00
Estimated cost of 1,660 square yards brick pavement.....	4,900.00
Estimated cost of drainage.....	500.00
Estimated cost of new buildings.....	12,000.00
Estimated cost of 630 feet of tracks and turnouts, as shown.....	900.00
Grading	50.00
Locomotive crane	5,000.00
Total estimated cost combination timber and concrete dock..	$35,750.00
Estimated cost of 310 feet of reinforced concrete dock.....	15,500.00
Total estimated cost with reinforced concrete dock.....	$38,850.00

A large amount of time is lost in the garbage removal service of the city, due to insufficient equipment of unloading facilities at the unloading stations and at the place of final disposition. Teams collect in large numbers and are forced to wait a long time, and this in many cases increases the total time of collection, hauling and unloading one wagon to fully eight hours. These long waits can be eliminated by the use of additional derricks. The additional cost for the operation of these derricks will more than be made up by a portion of the cost of the loss of time due to the present inadequate equipment. Provision should be made for the purchase and installation of these derricks in the 1914 budget.

The matter of the value of scrap which accumulates at the repair shops, as well as at the ward yards, was considered in connection with the value of the space taken up by same. Under existing laws, it is not possible for the city to dispose of scrap without giving specified time for advertising and obtaining bids. Where it is found that the scrap material is of sufficient value, same should be collected and disposed of more regularly so that the valuable space occupied by this material may be utilized to better advantage.

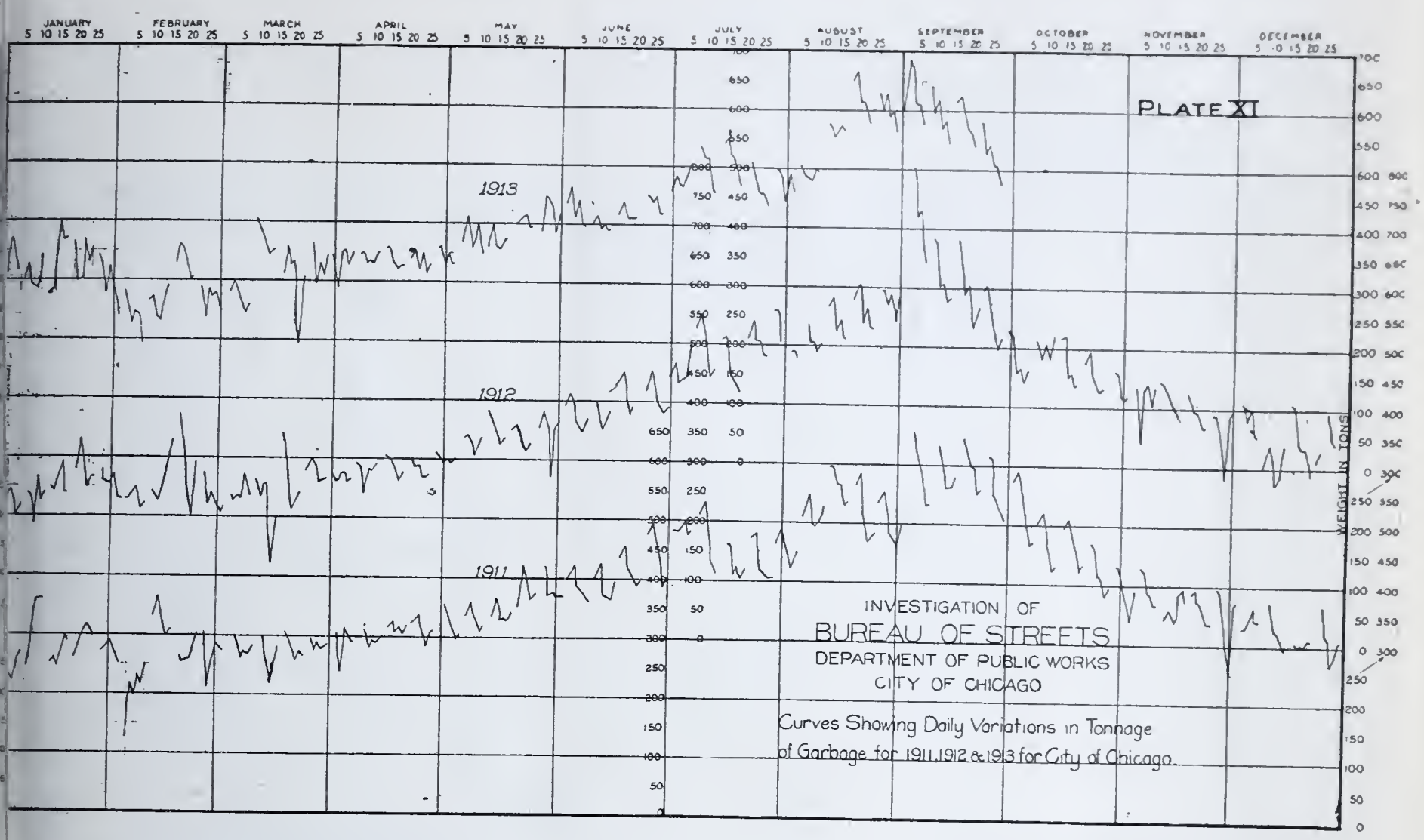
GARBAGE TANKS.

The steel metal tanks used on the garbage wagons by the city are supplied with iron covers which are attached by hinges on a common rod at the center of the top of the box. These tanks are at times loaded very heavily and receive rough usage both at the loading stations and at the place of final disposition. Under ordinary conditions it requires approximately three hours and fifty-five minutes to collect a full load of garbage. The larger number of collectors collect one load per day and the remaining time over the three hours and fifty-five minutes is spent in going to and from the loading station or disposal plant, or in waiting at the loading station. It has been found that practically 75% of the teams at the present time complete their collection and haul and return to the starting point within six or seven hours, and the remaining part of the eight-hour day is not devoted to any productive work. Under the present system of ward distribution it is is not possible to arrange for long and short hauls, which would take care of the time lost. The present condition can be remedied with profit and increased service by the provision of new tanks six or eight inches higher than those now in use. These new boxes should be obtained as the old tanks are used up.

RUBBISH COLLECTION AND DISPOSAL.

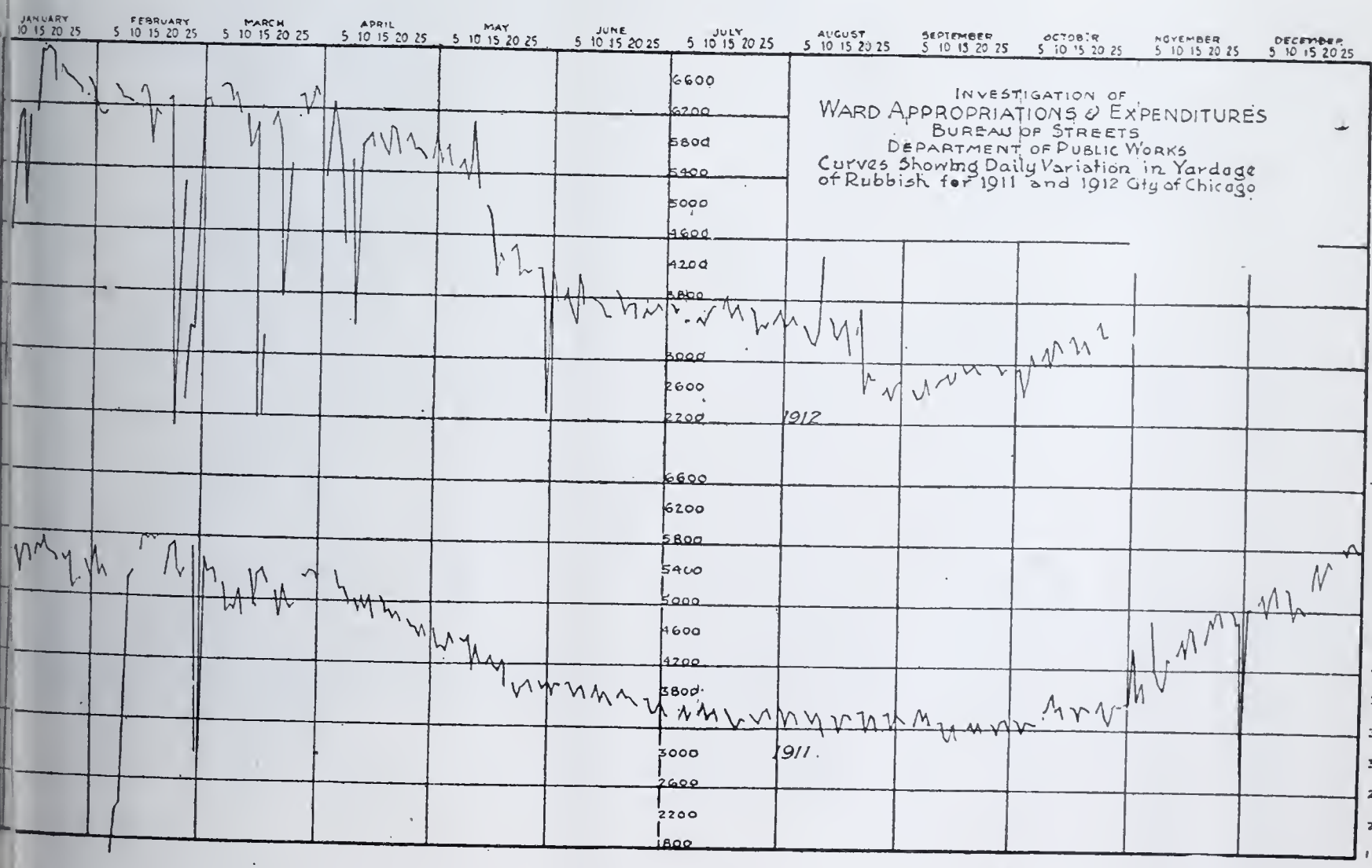
The problems of collection and haul are important phases of the disposal of rubbish. Collection, haul and disposal are so co-related that no final solution or basis can be adopted for one without careful study of the conditions and methods used in the other two. In order to determine the costs of collection, and the factors affecting it, study has been made as to time of collection, number of collections made each day by various teamsters, the service rendered, the rate of haul in miles per hour, location of dumps and the co-operation given the city's employes by the people served.

PLATE XI



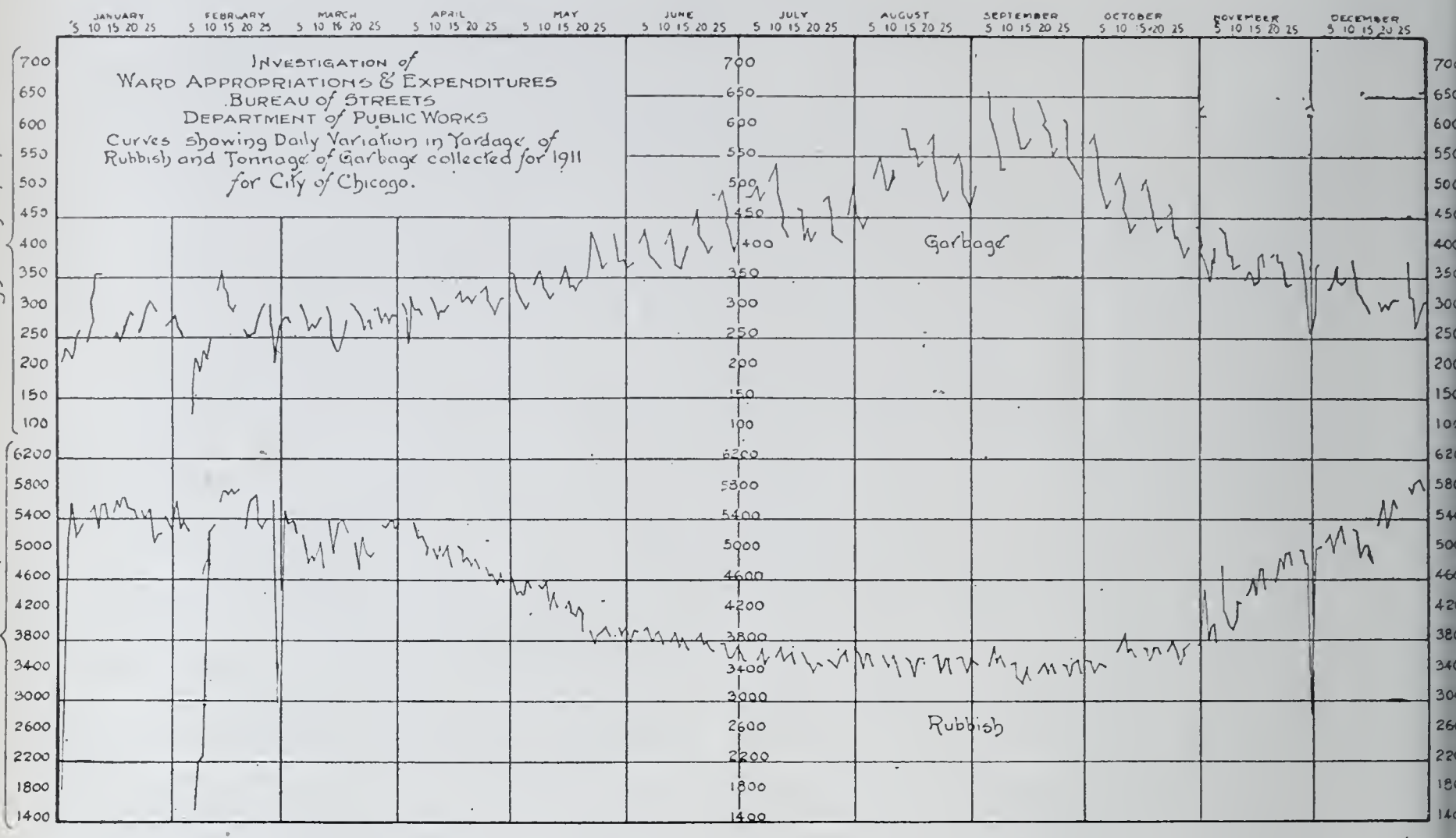
Efficiency Division - Civil Service Commission.
October 1913.

PLATE XII



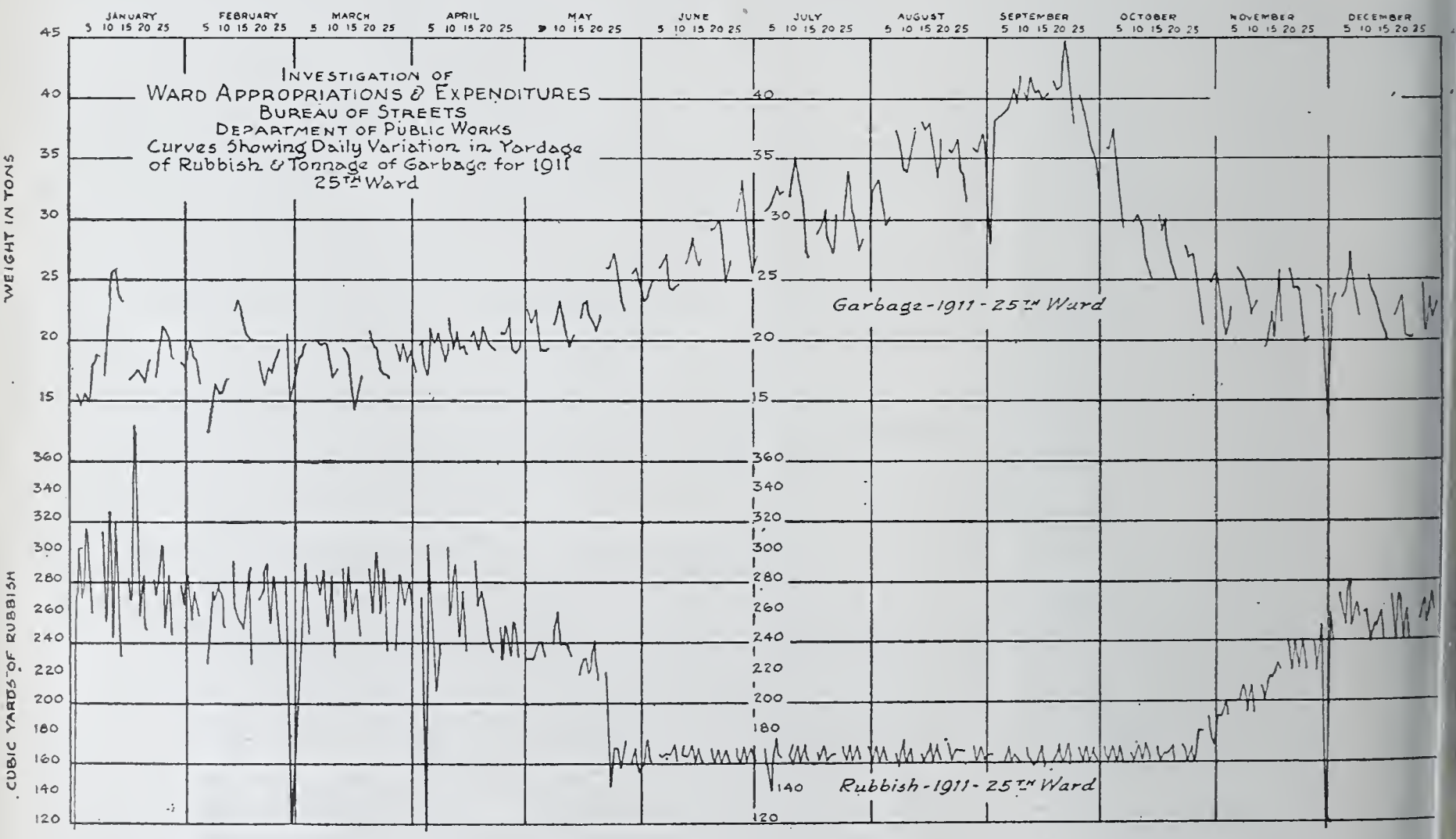
Efficiency Division - Civil Service Commission.
November - 1912

PLATE XIII



Efficiency Division – Civil Service Commission
October-1912

PLATE XIV



Efficiency Division-Civil Service Commissio
October-1912

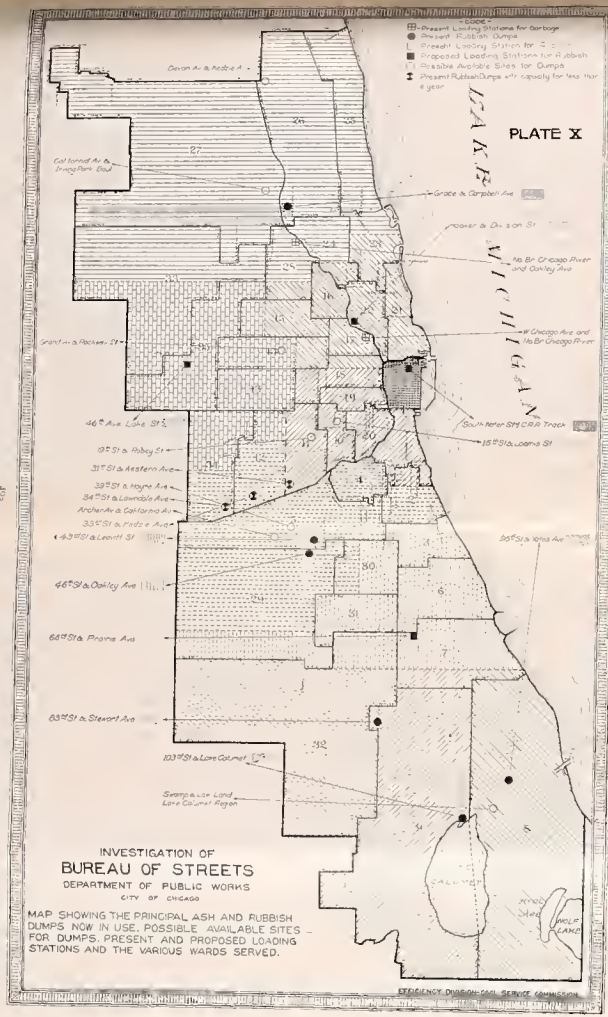


PLATE X
LEGEND
Present Loading Stations for Garbage
Present Rubbish Dumps
Present Loading Station for Ashes
Proposed Loading Stations for Rubbish
Possible Available Sites for Dumps
Present Rubbish Dumps with capacity for less than 1 year
LAKE MICHIGAN
Devon Ave. & Rednor Ave.
California Ave. & Irving Park Blvd.
Grace St. & Campbell Ave.
Hoyne Ave. & Dawson St.
16th St. Chicago River and Oakley Ave.
Western Ave. & Packers Ave.
Chicago Ave. and 16th St. Chicago River
46th St. & Lake St.
South Water St. & C.B.& Q. Tracks
18th St. & Loomis St.
39th St. & Hoyne Ave.
31st St. & Western Ave.
33rd St. & Hoyne Ave.
34th St. & Lowndale Ave.
Archer Ave. & California Ave.
33rd St. & Paulina Ave.
43rd St. & Leavitt St.
35th St. & Ashland Ave.
46th St. & Oakley Ave.
64th St. & Prairie Ave.
83rd St. & Stewart Ave.
103rd St. & Lake Calumet
Swamp & Low Land Lake Calumet Region
CALUMET
WOLF LAKE
INVESTIGATION OF
BUREAU OF STREETS
DEPARTMENT OF PUBLIC WORKS
CITY OF CHICAGO
MAP SHOWING THE PRINCIPAL ASH AND RUBBISH DUMPS NOW IN USE, POSSIBLE AVAILABLE SITES FOR DUMPS, PRESENT AND PROPOSED LOADING STATIONS AND THE VARIOUS WARDS SERVED.
EFFICIENCY DIVISION-CIVIL SERVICE COMMISSION

PLATE XV.

MAP SHOWING DISTRICTS OF UNIFORM ASH AND RUBBISH COLLECTION SERVICE FOR 1914

INVESTIGATION APPROPRIATIONS AND EXPENDITURES

DAILY, SUMMER TRI-WEEKLY, WINTER

TRI-WEEKLY, SUMMER AND WINTER

BI-WEEKLY, SUMMER TRI-WEEKLY, WINTER

NO SEPARATION

SUMMER MONTHS JUNE 1ST TO OCT. 31ST

The following tendencies have been found to control the cost of rubbish collection and disposal service:

(a) Layout of district and condition of pavements.
(b) Character and distribution of population and buildings.
(c) Character and location of dumps.
(d) Distance and time required to collect.
(e) Distance and time required to haul.

Table VIII gives complete information, by wards, as to the character of population, districts and methods used at the present time in the collection and disposal of rubbish and ashes in the city. Analysis of the conditions in the city of Chicago for several years past indicates that a natural law has been followed throughout the city in the matter of growth, and that certain set cycles of growth have obtained. The controlling tendencies do not change materially while the cycles change at a given rate which can be determined by conditions existing in each section of the city.

Using the law of tendencies for calculating the rubbish to be collected from year to year, and checking the amount so determined against the characteristics of population, the amount of rubbish to be collected during each month of 1914 has been estimated and is shown in detail in Table VIII. Study of these laws is shown by the curves of daily variations in amounts of refuse collected in different wards of the city, and in the entire city during 1911 and 1912 in Plates XII to XIV inclusive.

The five cubic yard rubbish box used in this city is sufficient to hold all that a team can economically and conveniently haul through the unpaved alleys during the winter months. However, the material to be removed during the summer months is of light, combustible nature and a team can, under normal conditions, conveniently draw at least nine cubic yards. As indicated above, the principal cost of rubbish disposal is the collection and haul; the greatest economy will, therefore, result when a team can collect the maximum possible quantity in one load. Wagons designed with lower bodies will allow of larger loads. At the same time the height required to raise the pail to empty the rubbish is reduced, with the result that the efficiency of labor will be greatly increased. Provision whereby sideboards can be hinged to the ordinary rubbish box will adapt the box to a five cubic yard load during the winter months and to larger loads during the summer season.

STANDARD FOR RUBBISH REMOVAL.

The estimates for appropriations for the collection and removal of ashes, refuse and miscellaneous wastes are based upon the service as shown by Plate XV. The factors considered which enter into the determination of service to be given various sections of the city in order to produce the uniform results and to keep the condition of the city as near perfect as practical, are as follows:

1. Congestion and character of population.
2. Character of dwellings.
3. Death rate.

Studies have been made of the time of collection and haul of rubbish in the different sections of the city. While there are conditions that may occasionally require special service, the uniform standards herein determined should be the basis of service and amount of work to be required and of the appropriations for this service.

It has been found that an average of 25 minutes for dumping is required and an average rate of haul of 2.7 per hour can be attained under ordinary conditions. The average time of collection of one load of rubbish was found to be 2.0 hours in summer and 1.4 hours in winter. In the Eighth and Ninth Wards these conditions do not obtain on account of long collection routes and bad roads, but the units as given above are liberal and cover conditions in general. Details of the service to be furnished and the length of haul and quantities of rubbish estimated for each ward for 1914 are given in Tables VII and VIII and Plate XV.

The figures in Table VII indicate the present cost of collection and the haul of rubbish in the different sections of the city. With the provision of at least ten additional loading stations and local incinerator plants, the present cost will be materially decreased and the service greatly bettered. An arrangement whereby the rubbish can be hauled by street railway cars from the local stations to these plants and the provision of motor equipment would further decrease the present costs of rubbish disposal. The matter of motor equipment is considered under the title of "Motor Trucks" in the latter part of this report.

Estimates for ward appropriations, based upon the actual working conditions as obtain at present, are included in Table III.

A summary of the rubbish removal standard is given as follows:

Standard time of collection, summer.....2 hours
Standard time of collection, winter.....1 hour 24 minutes
Rate of travel of team, summer and winter.....2.7 miles per hour

PRESENT AND PROPOSED SITES FOR STATIONS.

Investigation of the present and possible new sites for loading stations for the disposition of rubbish and street dirt has been made and several available loading station sites have been found which would greatly reduce the present long hauls in some of the wards in the city. The matter of the provision of local incinerators has been considered in conjunction with new loading stations and is taken up under the heading "Local Incinerators."

Plate X shows the location of the present and the proposed sites for the rubbish dumps and loading stations which have been considered. Various types of loading stations have been studied and plans for an improved type have been prepared These are shown in Plates XVII and XVIII. The details of these plans are taken up under the heading, "Improved Loading Stations."

Loading stations for rubbish and street dirt have been put into operation to a limited extent to reduce the length of haul and thereby serve to lessen the unproductive work in connection with rubbish removal.

A station for this purpose has been built at Fifteenth place and Loomis street, which consists of an elevated platform about 28 ft. x 460 ft. x 8 ft. high with 60-ft. approaches, a spur track being built on each side of the platform from the street railway tracks on Blue Island avenue. All hauling is done from the platform to the rubbish dump by the street railway company, which also furnishes the motor dump cars for this purpose, while the city furnishes the trailing dump cars.

A second loading station is maintained in the Illinois Central Railway yards at the foot of South Water street, for the prime purpose of removing the street sweeping and catch basin cleanings collected in parts of the First and Eighteenth Wards.

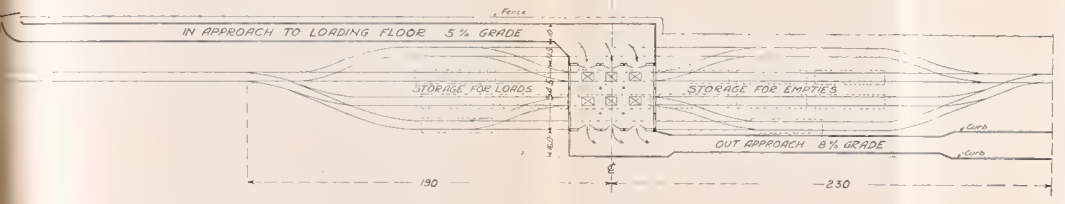
The operation of the loading station at Fifteenth and Loomis streets and the Illinois Central Railroad at foot of South Water street, has not been as economical as was expected on account of the lack of necessary cars and motors. By increasing the equipment and a rearrangment of the loading station at Fifteenth and Loomis streets, it is believed that the capacity could be so increased as to accommodate all of the teams for rubbish from the Tenth, Eleventh, Eighteenth, Nineteenth and Twentieth Wards, and all of the street dirt from the Tenth, Eleventh, Nineteenth and Twentieth Wards and a portion of the Eighteenth.

Following is a number of sites available for the location of rubbish loading stations:

Goose Island—Division and Hooker Streets.

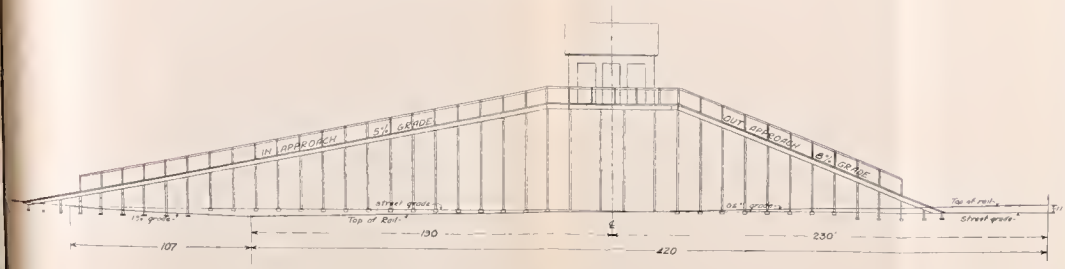
This site has been considered for the location of a loading station and local incinerator for some time. Conferences have been held with officials of the Chicago, Milwaukee & St. Paul Railway Company, who own the property, for concessions to the land adjoining the tracks. The loading station installed on this site would serve a whole or part of Wards 14, 15, 16, 17, 18, 21, 22, and 23. The refuse from this station could either be destroyed at the local incinerator built adjoining the station, or trans-

PLATE XVII.



GENERAL LAYOUT of STATION for LOADING REFUSE on RAILWAY CARS

Scale 1 in = 20 ft



ELEVATION

Vert Scale 1 in = 5 ft

Horz Scale 1 in = 20 ft

INVESTIGATION OF

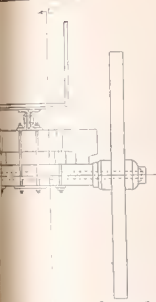
BUREAU OF STREETS

DEPARTMENT OF PUBLIC WORKS

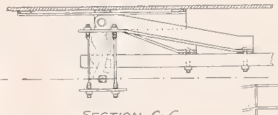
CITY OF CHICAGO

Efficiency Division - Civil Service Commission - Sept 1915

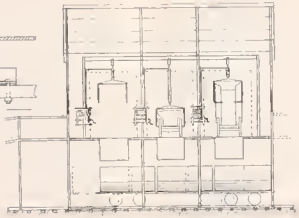
PLATE XVIII.



DETAIL SHOWING THE HINGE OF THE WAGON BOX TO THE GEAR.

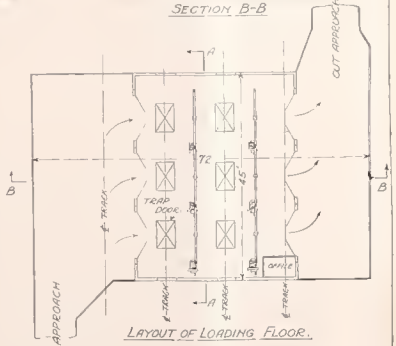


SECTION C-C.

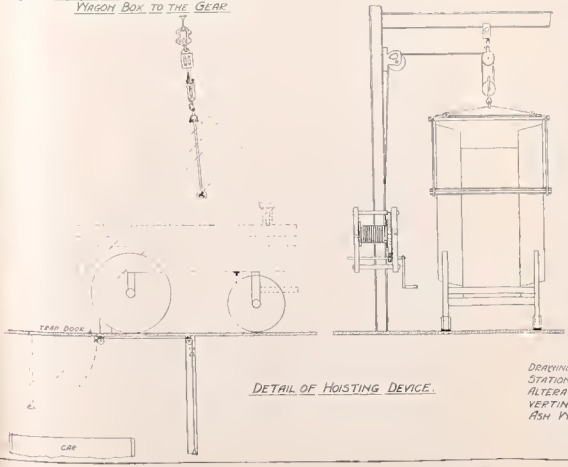


SECTION A-A.

SECTION B-B.



LAYOUT OF LOADING FLOOR.



DETAIL OF HOISTING DEVICE.

DRAWING SHOWING DETAILS OF LOADING STATION FOR HANDLING REFUSE, AND ALTERATIONS NECESSARY FOR CONVERTING PRESENT RUBBISH AND ASH WAGONS INTO REAR END DUMP WAGONS

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ported by electric street or steam railway line to the dumps at Campbell avenue and Grace street.

Vicinity of Forty-sixth Avenue and Chicago Avenue or Lake Street.

The territory in this neighborhood is building up rapidly, and while the total delivery at a station built on this site would in all probability be light as compared to the delivery at Goose Island station, provision should be made for the future. A loading station, with the provision for a local incinerating plant, should contemplate the future demands. A station at this site would serve a part or all of the following wards: 12th, 13th, 14th, 15th, 34th, and 35th. The refuse from this station could be disposed of at the dumps at Forty-sixth street and Oakley avenue, or Forty-third and Leavitt streets until such time as the local incinerator is erected.

Vicinity of Sixty-fourth Street and Prairie Avenue.

A loading station located at this site would serve to relieve the present congestion at the dump at Forty-third and Leavitt streets and at Forty-sixth street and Oakley avenue and prolong their life as dumps. This station would serve to shorten the haul of the rubbish now coming from the 6th, 7th, 30th, 31st, and 32d wards. The refuse loaded at this station could be disposed of at either the Ninety-fifth street and Yates avenue or One Hundred and Third street and Lake Calumet dumps.

Aside from the above, there are a number of additional sites in different sections of the city which should be considered in the provision for the purchase of sites for the building of ten additional loading stations, herein recommended.

IMPROVED LOADING STATIONS.

The near-by dumping facilities are disappearing so rapidly as to make the cost of team haul excessive. To relieve this condition a general plan has been prepared of a loading station which anticipates the use of street railway cars for the removal of rubbish and dirt and which it is believed will reduce the time of unloading from the wagon to a minimum, relieve the congestion now experienced around such stations, and handle this waste within an economical radius.

In adopting a design for a loading station and a method of unloading to be there employed, consideration has been given to the special type of rubbish wagons which are in use in the city. The wagons used in collecting street and alley refuse are at present furnished the city by teaming contractors and are of a standard type required by the city. It was considered best to adopt such methods of unloading as would reduce to a minimum any expense of remodeling the wagons in use and which would also be applicable to a new standard type of self-unloading wagon that might later be adopted for this service.

The method used at the Loomis street loading station of unloading rubbish is to back the wagon up to a car, the top of which is on a level with the unloading platform, and unload by hand through the tail gate. This method is uneconomical as to time and labor because of the delay to teams and the large platform gang necessary.

An unloading station must provide a structure with equipment sufficient to unload wagons at the rate of maximum delivery to the station. The track arrangement must be such that cars can be moved to and from the unloading floor with the minimum expense and also to provide sufficient storage space for empty and loaded cars.

Plate XVII shows a layout and profile of an unloading station that provides facilities for unloading wagons at the rate of about 36 teams per hour without any unreasonable delay to the teams. The track arrangement as shown gives space for about 14 cars and provides for movement of cars by gravity to position under the unloading floor and to the storage yard.

The method of unloading is shown in detail in Plate XVIII. The wagon box is hinged to the gear above the rear axle so that the front end of the box may be elevated and the wagon unloaded through the tail gate. The hoisting device consists

of pulleys and winch fastened to an overhead support. Plate XVIII also shows the details of the plan and sections of the unloading floor.

Wagons reach the unloading floor by an approach on a 5% grade and pass under the hoisting device where the wagon is unloaded into a car below through a trap door in the unloading floor. Three wagons may be unloaded at one time by one setting of the car. While the car is being placed for another three loads, the wagons may be unloading into cars on the other track, thus avoiding any delay on account of waiting for cars. After the wagon is unloaded, it leaves the unloading floor by an out approach on a 10% grade, thus avoiding any congestion with the teams entering the loading station.

The side dump cars of about 30 cu. yd. capacity, similar to the ones in use at the present time, are suitable for this service. The cost of motor service is an item of considerable expense, and to reduce this cost to a minimum the motor should not be permitted to carry loads so that the delays due to loading motors may be avoided.

It is estimated that loading station shown on Plate XVII exclusive of the cost of cars and motors will cost approximately $12,000. Two men for handling cars, one man for levelling and cleaning around the track and three men on the unloading floor will be required to operate the station. Local incinerators for rubbish can be adapted to these stations without any appreciable change in plans or cost of the station.

The construction of a type of loading station, as shown in Plates XVII and XVIII should be considered for the proposed new stations, particularly at Goose Island (Division and Hooker streets).

LOCAL INCINERATORS.

With the rapid filling of rubbish dumps and the consequent increase in the length of haul and the demand for more sanitary methods of disposing city wastes, the question of the economy of the incineration of garbage, ashes and other refuse has become vitally important. The building of modern and sanitary local incinerators to meet the demands of adjacent wards, and particularly in the southern and northwestern parts of the city, will result in large savings in cost of haul and disposal. The present costs of collecting and hauling the garbage and ashes and rubbish in different sections of the city are indicated in Table VII.

In connection with the building of these incinerators, provision of modern, improved loading stations and good transportation service will aid further in deceasing the cost of collection and haul. The plan providing for the building of local incinerators adjacent to loading stations will tend to reduce the cost of supervision of both platform and incinerator and will furnish means by which the resulting klinker from the incinerator, which cannot be used economically for filling in low streets and alleys in the district in which the rubbish was collected, can be economically removed by steam or street railway. This plan will also make this scheme of disposal more flexible, as in the winter months when the refuse delivered is largely incombustible, it can be loaded directly onto the refuse cars.

The plans for an incinerating plant at Ninety-fifth street and Stony Island avenue are now under completion and provision should be made for this plant and an additional 100-ton incinerator plant in the northern part of the city in the next appropriation ordinance.

AVAILABLE LAND FILLS—HAUL.

At present, the city disposes of all rubbish by dumping into large dumping holes. There are now seven large dumps and a few small ones in use. With the completion of the various park extensions into Lake Michigan, and the filling in of near-by clay holes, the problems of refuse haul will become more and more complex.

A plan which would provide for more extensive use of either the street car

system or the steam railways for hauling street wastes and other refuse to the distant clay holes or low marsh lands appears to be both practical and economical. This method has been in use in Chicago to a limited extent for the past three years.

The various dumps now in use and those available are so situated that the average total length of haul in many cases is five miles, and in one reaches eight miles. The plat shown in Plate X gives the location of all present rubbish dumps, loading stations, etc. The following table further gives the rubbish hauls now necessary for each ward in the city which were used in the estimates of cost of haul of rubbish for 1914:

Ward.	Dump.	Average Haul (Miles). Winter.	Summer.
1	Twenty-seventh and Lake Michigan, Thirty-first and Western avenue, South Water street and Illinois Central Railroad	2.1	4.9
2	Twenty-seventh and Lake Michigan	1.2	1.2
3	Forty-sixth and Oakley avenue, and Thirty-ninth and Lake Michigan	1.4	3.8
4	Forty-third and Leavitt	3.7	3.7
5	Forty-third and Leavitt	1.2	2.1
6	Forty-sixth and Oakley, Eighty-third and Stewart, Fifty-first and Lake	1.7	5.2
7	Eighty-third and Stewart	1.7	4.0
8	Ninety-fifth and Yates	2.2	2.2
9	One Hundred and Third and Lake Calumet, Eighty-third and Stewart	1.95	1.95
10	Fifteenth and Loomis, Forty-third and Oakley avenue	2.7	2.7
11	Fifteenth and Loomis, Forty-third and Leovitt.	2.0	2.0
12	Thirty-third and Kedzie	1.9	1.9
13	Thirty-third and Kedzie	1.8	3.6
14	Thirty-third and Kedzie	2.0	4.4
15	Grace and Campbell	3.7	3.7
16	Grace and Campbell	3.75	3.75
17	Grace and Campbell	4.75	4.75
18	Fifteenth and Loomis, Thirty-third and Kedzie.	3.5	3.5
19	Fifteenth and Loomis	1.5	1.5
20	Fifteenth and Loomis, Thirty-first and Western.	2.25	2.25
21	Grace and Campbell, Lincoln Park and Lake Michigan	3.4	5.2
22	Grace and Campbell, Lincoln Park and Lake Michigan	3.1	4.2
23	Grace and Campbell, Lincoln Park and Lake Michigan	2.2	3.3
24	Grace and Campbell	2.2	2.2
25	Grace and Campbell	2.0	4.0
26	Grace and Campbell	2.0	2.0
27	Grace and Campbell	2.0	2.6
28	Grace and Campbell	2.2	2.2
29	Forty-sixth and Oakley	1.5	2.6
30	Forty-sixth and Oakley	1.5	2.6
31	Forty-sixth and Oakley, Eighty-third and Stewart	1.5	3.4
32	Eighty-third and Stewart	1.8	2.2
33	Grace and Campbell	2.0	5.2
34	Thirty-third and Lawndale	1.5	1.8
35	Grace and Campbell, Thirty-third and Lawndale	1.5	4.0

ADDITIONAL RUBBISH DUMPS.

Consideration has been given to the additional location for the final disposition of rubbish, ashes and street dirt. The sites for dumping are becoming generally scarce. The demand for dumping space by contractors is much greater now than it has been in the past. If people who have low land which they wish filled can have any preference, they seem to prefer the material hauled by contractors to that hauled

by city wagons. On account of the difficulty in securing dumping privilege it is desirable, if possible, that the city obtain outright available sites for dumps. The ground when filled in to grade will be saleable at a much advanced price so that the actual cost for dumping accomodation will be less than the interest charges on the investment.

Plate X shows the location of the present rubbish dumps which are now in use, also the possible available sites for dumps for rubbish. The dumps at Thirty-first street and Western avenue, Thirty-third street and Kedzie avenue, Thirty-third and Lawndale avenue, which are limited in capacity and indefiniteness of the privilege for using, have not been considered in the general scheme for the handling and removal of rubbish.

The dump at Grace street and Campbell avenue has a capacity for the disposition of about five years' waste. In addition to this site, there are a number of dumping sites west of the north branch of the Chicago River near Irving Park boulevard; also others in the vicinity of Devon and Kedzie avenues.

At Forty-sixth street and Oakley avenue there is capacity for disposition of rubbish and ashes for approximately five years if used exclusively as a city dump.

The Chicago Junction Railway Company is now dumping its refuse at Forty-third and Leavitt streets and the city's privilege for using this site may be terminated at any time.

There are possible sites in the vicinity of Thirty-ninth street and Hoyne avenue and Archer and California avenues that may serve to take the place of these dumps should the city's privilege be terminated.

There are possible sites for dumps in the abandoned quarry near Western and Fulton avenues, between Kedzie and Central Park avenues, and the Illinois and Michigan Canal and the Santa Fe Railroad and the site at Nineteenth and Robey streets.

There are also several possible available sites for dumps, being mostly abandoned clay holes or swamp lands on the outskirts of the city. Sites in the vicinity of Irving Park boulevard and the Chicago River, also Kedzie and Devon avenues, would fit well into any plan for handling ash and rubbish that required dumps on the north side of the city. Swamp lands in the Lake Calumet region are plentiful and will eventually be brought up to grade, thus providing additional dumping facilities.

One source of inefficiency in the use of dump cars for the disposal of refuse at the dumps is the loss of time due to handling the refuse several times after the car is dumped in clearing it away from the track, and the expenditure of money necessary in shifting tracks continuously. The plan of handling such refuse by the use of cable-ways appears feasible and economical, and it is believed would result in relieving congestion at these places.

STANDARD AND ESTIMATES FOR STREET REPAIRS.

Section 2719 of the city code of 1911 requires that an annual license fee shall be paid to the city by all persons who use wagons or other vehicles for transporting persons or property upon the city streets, avenues or alleys. This article also specifies that all revenue derived from this source shall be kept as a separate fund and used in the repair and maintenance of pavements of the city out of reserve.

Analysis has been made of the accounts kept in the City Collector's office of the revenue obtained from each ward from such license fees, and of the records in the Bureau of Streets of the amounts expended since the passage of the ordinance in 1909. The quantities are given in Table XIV. As will be noted from this table, the expenditures for repair and improvement of streets and alleys in the different wards have not been uniform.

This activity has developed to a point where it is necessary to distribute the funds in such a manner as will keep the city pavements in good repair and take care of important through routes.

In order that the present available funds be sufficient to take care of this work,

repairs should be directed to the more permanent pavements at first and any remaining wheel tax money and that specifically appropriated for by the City Council should be used for the repair of other pavements. Where the cost of repair and maintenance is equal to or greater than the annual interest cost on new work, it is more desirable that new pavements be laid where possible, rather than have the old pavements repaired. Provision should be made in the ordinance whereby unexpended money of the wheel tax fund can be reverted to a general street repair fund. This will further aid the extension of through routes and upkeep of improved pavements.

In connection with the field investigation of the cleaning of all streets and alleys, special study was made of the factors and conditions which control the repair of improved pavements. It has been found that the cost for the maintenance and repair of pavements varies directly with the amount of traffic and the area and condition of pavement.

The traffic census on different streets having permanent pavements and other information as to character of different districts of the city has been used as a basis for grouping the different wards of the city as follows:

Group 1—Heavy traffic district including that portion of the city lying between Michigan street, Sixteenth street, Lake Michigan and Halsted street.
Group 2—The remaining parts of Wards 1, 17, 18, 19, 20, 21, 22, and Ward 2.
Group 3—Wards 4, 5, 10, 11, 13, 14, 15, 16, 23, 24, 28, 29, and 30.
Group 4—Wards 3, 6, 7, 8, 9, 12, 25, 26, 27, 31, 32, 33, 34, and 35.

Within these groups definite variations were found in the cost of maintenance of improved pavements, depending upon whether these pavements are on heavy traffic streets or non-traction streets but not main thoroughfares, or on light traffic streets. All the streets within each ward have accordingly been classified into three divisions within each of the above groups, as follows:

1—Traction streets.
2—Non-traction streets but main thoroughfares.
3—Light traffic streets.

The areas of the different kinds of improved pavements and the length of miles of unimproved pavements in the streets of each ward of the city have been obtained and are shown in Tables IX and X. Tables XI to XIII inclusive show the pavements which will be out of reserve in the different wards of the city in 1914, and all pavements, the reserve of which will expire in each of the next three years.

The unit maintenance cost for the different pavements included in the above classifications has been found to vary with the kind, age and condition of each improved pavement. Analysis of the records of the Bureau of Streets and in the Board of Local Improvements furnished figures as to the average unit cost of maintenance of different kinds of streets and different kinds of pavements. Special weights have been assumed for the different groups and the streets as above segregated. The maintenance units and weights have been used in the above classification to determine the estimate of the necessary funds for the maintenance of all permanent pavements which will be out of reserve in 1914. The unit maintenance cost which has been used for each kind of permanent pavement and the weights which were used for the different groups of wards and streets within groups are as follows:

Brick and Creosote Block Pavements.

Group.	Weights.	Traction Streets. 2	Through Route Streets. 1½	Light Traffic Streets. 1
1	2.5	9.4c	7.0c	4.7c
2	1.5	5.6c	4.2c	2.8c
3	1.0	3.72c	2.8c	1.86c
4	0.75	2.8c	2.1c	1.4c

TOTAL SQUARE YARDS OF PAVEMENTS BY WARDS OF IMPROVED STREETS AND LENGTH IN MILES OF UNIMPROVED STREETS, *Table IX*

WARDS	ASPHALT	BRICK	CEDAR	CONCRETE	CREOSOTE	GRANITE	MACADAM	COUNTRY ROADS	TOTAL	PER CENT	MILES UNIMPROVED	WARDS
1	421288	47958	18836		79462	403847	22069		993460	3.71	5.00	1
2	397048	22573	14648	440	15530	1156	141281		592676	2.20	2.50	2
3	364979	15913	19283		60957	24916	156716		642764	2.40	.75	3
4	420771	9397	12559			59646	36569		538942	2.00	4.50	4
5	223664	56325	61992		15590	159698	79859		597128	2.20	31.25	5
6	300804	55825	34788		94069		492189		977675	3.70	1.76	6
7	436246	78960	25499		9300		463836		1013841	3.80	22.00	7
8	121986	101968	41136				382716	54350	702156	2.60	43.00	8
9	63399	116987		3750			1171789	54460	1410385	5.30	129.50	9
10	267115	26689	3121		8347	32572	844		338688	1.30	3.20	10
11	291637	72137	12740			72011	17526		466051	1.80	8.00	11
12	354700	15408	49096	15000		13554	62511		510269	1.90	6.45	12
13	509264	94737	71573			2819	20471		698864	2.60	5.32	13
14	479706	137756	24538		1526	19644	24552		687722	2.60	10.15	14
15	421073	61566	69676		27802	29972	25373		635462	2.50	4.12	15
16	293787	16868	3004			75364	4384		393407	1.50	2.88	16
17	219589	97045	52816		5265	39282	1267		415264	1.60	2.75	17
18	412367	161595	20397	500	9855	239668	9777		854159	3.20	1.80	18
19	211823	123550	3400	700	7220	43622	2432		392747	1.50	.58	19
20	180673	64034	6532			99199	1167		351655	1.30	3.60	20
21	459189	45393	2123	17000	5148	117860	32038		678751	2.60	1.33	21
22	310718	80566	8384			54622	4459		458749	1.70	4.97	22
23	438964	47017	16590		30913	2236	116715		652435	2.50	.60	23
24	341959	46670	64179		52059	67777	40126		612770	2.30	5.94	24
25	246581	107605	55443	2066			948680		1360375	5.10	5.75	25
26	423259	166099	20018		33317	26788	550270	56106	1255857	4.70	33.50	26
27	359673	117797	34163		15696	10360	496948	123348	1157985	4.30	315.00	27
28	417713	11750	59916		44965	70430	56755		661529	2.50	7.61	28
29	181140	99599	106075			52956	238973		678743	2.60	160.19	29
30	158427	73897	155516		13519	65890	153772		621021	2.30	10.86	30
31	128802	136754	99733			10275	489665		865229	3.40	4.20	31
32	140551	129686	58550	6106		1467	1217941	52800	1607101	6.00	300.00	32
33	467026	160812	69263			38180	377953	14520	1127754	4.20	118.00	33
34	344685	43738	43117	4000			256236		691776	2.60	20.00	34
35	512595	80849	41039		43881		250170	7260	935794	3.50	39.10	35
									26570184	100.00	1316.16	TOTAL
												PER CENT

AND LENGTH IN MILES OF UNIMPROVED ALLEYS.

WARDS	ASPHALT	BRICK	CONCRETE	CREOSOTE	GRANITE	MACADAM	TOTAL IMPROVED ALLEYS	PERCENT	TOTAL IMPROVED STREETS	PERCENT	TOTAL IMPROVED STS & ALLEYS	PERCENT	TOTAL UNIMPROVED ALLEYS MILES	WARD
1	19833	46102	3213	4595	43266		117009	16.00	993460	3.71	1110469	4.10	7.03	1
2	40274	84465	3560	2046			130345	17.80	592676	2.20	723021	3.30	7.90	2
3	7383	78441	18409	3778			108011	14.70	642764	2.40	750775	2.70	9.30	3
4								0.00	538942	2.00	538942	2.00	18.75	4
5		1444					1444	0.20	597128	2.20	598572	2.20	41.30	5
6		29429	3600		757		33986	4.60	977675	3.70	1011661	3.70	18.00	6
7		2650	930				3580	0.50	1013841	3.80	1017421	3.70	44.62	7
8								0.00	702156	2.60	702156	2.60	251.00	8
9						1240	1240	0.20	1410385	5.30	1411625	5.20	124.05	9
10		756					756	0.10	338688	1.30	339444	1.20	10.90	10
11									466051	1.80	466051	1.70	16.10	11
12									510269	1.90	510269	1.80	20.44	12
13		26138					26138	3.60	698864	2.60	725002	2.60	20.20	13
14	1005	17986					18991	2.50	687722	2.60	706713	2.60	25.94	14
15		1320					1320	0.20	635462	2.50	636782	2.30	30.00	15
16		1006					1006	0.10	393407	1.50	394413	1.40	15.00	16
17		3009	527				5536	0.80	415264	1.60	420800	1.50	10.22	17
18	4431	36246	1608		22180		64465	8.80	854159	3.20	918620	3.40	17.94	18
19	684	24674			3278		28636	3.90	392747	1.50	421383	1.50	8.52	19
20		9043					9043	1.20	351655	1.30	360698	1.30	10.00	20
21	7205	51850		6110	16920	1981	84066	11.50	678751	2.60	762817	2.80	5.00	21
22		14389			1331		15720	2.10	458749	1.70	474469	1.70	10.50	22
23	1120	54198	3422	3046		535	62319	8.40	653435	2.50	714754	2.60	13.50	23
24		2160					2160	0.30	612770	2.30	614930	2.20	28.09	24
25		11022	180				11202	1.50	1360375	5.10	1371577	5.00	45.00	25
26								0.00	1255857	4.70	1255857	4.60	46.40	26
27								0.00	1157985	4.30	1157985	4.20	300.00	27
28		1036					1036	0.10	661529	2.50	662565	2.40	28.21	28
29								0.00	678743	2.60	678743	2.50	147.00	29
30								0.00	621021	2.30	621021	2.30	30.59	30
31		114					114	0.00	865229	3.40	865343	3.20	30.80	31
32		1571					1571	0.20	1607101	6.00	1608672	5.90	275.00	32
33		2493					2493	0.30	1127754	4.20	1130247	4.10	80.00	33
34								0.00	691776	2.60	691776	2.50	33.70	34
35		1411					1411	0.20	935794	3.50	937205	3.40	41.50	35
TOTAL	81935	504953	35649	19575	87732	3754	733598	100.00	26579184	100.00	27312782	100.00	1820.50	
PERCENT	11.2	68.8	4.8	2.7	12.0	0.5	100.00							PERCENT

TABLE XI

AREAS OF PAVEMENTS OUT OF RESERVE IN DIFFERENT WARDS OF THE CITY OF CHICAGO - 1914.

WARD	ASPHALT	BRICK	CEDAR	CONCRETE	CREOSOTE BLOCK	GRANITE	MACADAM	TOTAL AREA	W
1	348 926	63 143	18 836	3 213 (A)		430 253	22 069	886 440	
2	301 780	43 267	14 648	4 000		1 156	141 281	506 132	
3	140 388	27 003	19 283	18 409 (B)	25 814		156 716	387 613	
4	109 740	6 202	12 559			29 813	36 569	194 883	
5	50 123	2 666	61 992			52 519	79 859	247 159	
6	116 711	41 680	34 788	3 800 (C)	6 486	757	492 189	696 379	
7	214 422	68 762	25 499	(930			463 836 (D)	773 449	
8		25 462	41 136				437 066	503 664	
9	47 296	40 252		3 750			1 227 489	1 318 787	
10	131 184	24 304	3 121			15 771	844	175 224	
11	67 635	62 387	12 740			47 053	17 526	207 341	
12	1331121	9 231	49 096			13 554	62 511	267 513	
13	350 163	43 890	71 573	88		2 819	20 471	489 004	
14	267 869	121 027	24 538		1 526	12 529	24 552	452 041	
15	187 241	61 566	69 676				25 373	343 856	
16	191 352	5 630	3 004			701	4 383	205 071	
17	101 895	95 700	52 816	527		6 677	1 267	258 882	
18	303 856	164 717	20 397	2 108 (E)		189 837	9 777	690 692	
19	158 104	122 866	3 400	700 (F)		41 206	2 432	328 708	
20	112 081	55 859	6 532			55 150	1 167	231 789	
21	305 950	67 689	2 123	17 000	I 382	97 221	34 019	525 369	
22	140 909	80 049	8 384			13 497	4 459	247 298	
23	171 655	53 583	16 590	3 422			117 248	362 498	
24	66 748	30 839	64 179			8 101	40 126	208 993	
25	83 940	66 142	55 443	2 246			917 964	1 125 735	
26	85 063	65 550	20 018				586 376	757 007	
27	57 276	47 041	34 163				620 296	758 776	
28	90 698	8 978	59 916		12 499		56 755	228 846	
29	98 661	29 875	106 075			9 092	238 973	482 676	
30	49 466	18 939	155 516			6 644	153 772	384 337	
31	36 060	67 470	99 733				489 665	692 928	
32	65 331	30 403	58 550	6 106		1 467	1 270 741	1 432 598	
33	204 875	44 865	69 263			9 829	392 473	721 005	
34	126 983		43 117	4 000			256 236	430 336	
35	193 768	33 676	41 039				257 430	525 913	
TOTAL	5 111 270	1 730 413	1 379 743	70 299	47 659	1 045 646	8 663 911	18 048 932	

(A) Includes 1 800 yards Granitoid
(B) " 5 500 " "
(C) Includes 2200 yards Granitoid
(D) " 33 634 " Novaculite
(E) Includes 500 yards Granitoid
(F) " 700 " "

Chicago, October 10, 1913.

EFFICIENCY DIVISION - CIVIL SERVICE COMMISSION

TABLE XII

AREAS OF PAVEMENTS RESERVE OF WHICH EXPIRES DURING 1914

WARDS	ASPHALT	BRICK	CREOSOTE BLOCK	GRANITE	MACADAM	TOTAL AREA
1	38767	11719	1571	8627		60684
2	57826	26485	2046			86357
3	23307	14364	11382	15372		64425
4	115975			20109		136084
5	76976			49577		126553
6	42319	2652	13357			58328
7	72665	1682				74347
8	27870	25200				53070
9		6974				6974
10	25825	756		2400		28981
11	66574					66574
12	51090					51090
13	63087	449				63536
14	56034	13653				69687
15	59887					59887
16	51425	774		4800		56999
17	65253	1667	1242	13010		81172
18	41539	10907		52411		104857
19	21957	2217	7220	1516		32910
20	17062	420		10758		28240
21	39549	8307	2848	17560		68264
22	82767	1504		12996		97267
23	128856	5679	6080			140615
24	54029	3291	24323			81643
25	47252				27436	74688
26	30039	17779	24323			72141
27	19017					19017
28	88436	2200		8587		99223
29		8838		25688		34526
30	41711	40482		33381		115574
31	3469	28740		10275		42484
32	15370	18358				33728
33	61906			23911		85817
34	34303	16147				50450
35	113130					113130
TOTAL	1735272	271244	94392	310978	27436	2439322

AREAS OF PAVEMENTS RESERVE OF WHICH EXPIRES DURING 1915.

ASPHALT	BRICK	CREOSOTE BLOCK	GRANITE	TOTAL AREA	WARDS
24323	7641	45134	6277	83375	1
51927	16862			68789	2
68041	20337	1277	5698	95353	3
110465	1445		9724	121634	4
52131	39939		20576	112646	5
58827	4504	7697		71028	6
	2586			2586	7
42609	16888			59497	8
	10200			10200	9
35984	2385			38369	10
58687			23580	82267	11
87511	6177			93688	12
64716	51545			116261	13
106911	13235		7115	127261	14
67167	929		13958	82054	15
22758	1074		24898	48730	16
38237			14997	53234	17
44386	6064		9956	60406	18
23560	4406		2573	30339	19
19531	10261		24871	54663	20
80228	9213	3648	8243	101332	21
29123	5727		11291	46141	22
99242	5767	14224	2236	121469	23
115640	1000		53038	169678	24
58392	33218			91610	25
146835	8760		12779	168374	26
69597	41039			110636	27
86536	1608		42378	130522	28
7156	7536			14892	29
36636	7651		7612	51899	30
23421	14283			37704	31
1840	17403			19243	32
76130	44124			120254	33
59945	8241			68186	34
68498	1411			69909	35
1936790	423459	71980	301800	2734029	

AREAS OF PAVEMENTS RESERVE OF WHICH EXPIRES DURING 1916

WARDS	ASPHALT	BRICK	CREOSOTE BLOCK	GRANITE	TOTAL AREA
1	29105	8757	22907	1443	62212
2	25789	15547			41336
3	119552	29105	24979	3846	177482
4	60271				60271
5	21253	8334		27456	57043
6	66937	19717	51076		137730
7	111826	1520			113346
8	16777	12108			28885
9	16103	59561			75664
10	50491			14401	64892
11	75551				75551
12	79128				79128
13	27888	22147			50035
14	24141	6727			30868
15	73852	391	27802	9561	111606
16	16721	10396		7793	34910
17	14204	2935		4598	21737
18	17094	8616		5901	31611
19	9086	8088		1605	18779
20	24417	3590		8420	36427
21	19671	9686		716	30073
22	53803	5493		4625	63921
23	27391	18551	10050		55992
24	67282	12580	19292	6638	105792
25	52097	14240			66337
26	82869	29380		14009	126258
27	117123	9817		10360	137300
28	84202		30729	19465	134396
29	11603	40650		18176	70429
30	30614	6825		18253	55692
31	63452	8395			71847
32	26480	51733			78213
33	48068	36616		4440	89124
34	39122				39122
35	108480	31373	43881		183734
TOTAL	1712443	492878	230716	181706	2617743

AREAS OF PAVEMENTS RESERVE OF WHICH EXPIRES DURING 1917

ASPHALT	BRICK	CONCRETE	CREOSOTE BLOCK	GRANITE	MACADAM	TOTAL AREA	WARDS
	2800			513		3313	1
	4877					4877	2
21074	3545					24619	3
24320	1750					26070	4
23181	6830		15590	9570		55171	5
16010	16701		15450			48161	6
33480	7060		9300			49840	7
34730	22310					57040	8
							9
23631						23631	10
23190	9750			1378		34318	11
3850		15000				18850	12
3410	2844					6254	13
22319	1100					23419	14
27199						27199	15
11531				15400		26931	16
	1752					1752	17
9923	4104		9855	800		24682	18
	10647					10647	19
6582	2997					9579	20
17723	2348		1260	11040		32371	21
4116	2182			13544		19842	22
12940	17635		3605			34180	23
39260	1120		8444			48824	24
4900	5027				3280	13207	25
78453	44630		8994			132077	26
96660	19900		14696			131256	27
65888			1737			67625	28
63720	12700					76420	29
			13519			13519	30
2400	17980					20380	31
31530	13360					44890	32
76047	38000					114047	33
84332	19350					103682	34
28719	15800					44519	35
891118	309099	15000	102450	52245	3280	1373192	

Granite Block Pavements.

Group.	Weights.	Traction Streets. 2	Through Route Streets. 1½	Light Traffic Streets. 1
1	2.5	7.0c	5.25c	3.5c
2	1.5	4.2c	3.15c	2.1c
3	1.0	2.8c	2.1c	1.4c
4	0.75	2.1c	1.575c	1.05c

Asphalt Pavements.

Group.	Weights.	Traction Streets. 2	Through Route Streets. 1½	Light Traffic Streets. 1
1	2.5	10.0c	7.5c	5.0c
2	1.5	6.0c	4.5c	3.0c
3	1.0	4.0c	3.0c	2.0c
4	0.75	3.0c	2.25c	1.5c

Macadam Pavements.

The necessary maintenance of macadam pavements has been determined by study of the condition and traffic on the different streets. The wards of the city have been grouped as follows:

Group 1—Wards 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 28, 30.
Group 2—Wards 7, 8, 9, 25, 26, 27, 29, 31, 32, 33, 34, 35.

Analysis of the maintenance costs of macadam and cedar block pavements indicated that the average unit costs for maintaining and improving such pavements in this city are as follows:

Unit cost of maintaining macadam, exclusive of oiling and screening	$0.0225	per sq. yd.
Unit cost of oiling	.02	per sq. yd.
Unit cost of screening	.028	per sq. yd.
Unit cost of resurfacing cedar block pavement with crushed stone	$6,000.00	per mile

The above units have been used in estimating the cost of maintaining and improving the macadam and cedar block pavements in the city during 1914.

The estimated repairs to macadam pavements have been based upon the traffic and general condition of such pavements. The estimated area of macadam pavements which will require screening and oiling has been proportioned on the basis of the condition and extent of pavement and general character of frontage.

The unit maintenance cost which has been used in estimating the repair and improvement of the fifty-five miles of country roads is $750 per mile. This amount will not be sufficient to repair and improve the entire area of country roads, but will take care of the most necessary repairs.

The detailed estimate of maintenance and improvement of the above pavements by wards and for the entire city are included in Table XV. Percentages of the total cost are shown for each ward. The estimates included in this table have been segregated into the cost of repair of permanent pavements, the cost of oiling and screening macadam and macadamizing cedar block pavements and the cost of maintaining all macadam pavements in the city.

EMERGENCY NEEDS—ESTIMATES.

In addition to the ordinary work of the cleaning and repair of streets and alleys and the removal of the city's wastes, the Bureau of Streets is called upon to do emergency work in the care of unimproved streets, temporary repairs of holes and settlements in paved streets, building plank sidewalks, culverts and crossings at

SUMMARY OF COLLECTIONS, EXPENDITURES AND PERCENTAGES OF VEHICLE TAX FUND FOR REPAIR OF STREETS IN THE DIFFERENT WARDS OF THE CITY.

1909 - 1912 - AND ESTIMATED COLLECTION FOR 1913 AND 1914.

	1909			1910			1911			1912			1913		1914	
WARD	AMOUNT COLLECTED	AMOUNT EXPENDED	% EXP OF COLL.	AMOUNT COLLECTED	AMOUNT EXPENDED	% EXP PF COLL.	AMOUNT COLLECTED	AMOUNT EXPENDED	% EXP OF COLL.	AMOUNT COLLECTED	AMOUNT EXPENDEL	% EXP OF COLL.	AMOUNT COLLECTED TO OCT. 1ST	ESTIMATED AMOUNT TO BE COLLECTED	ESTIMATED COLLECTION	WARD NO.
1	53,671.00	49,249.69	91	28,278.17	33,223.35	118	29,151.11	27,087.27	93	47,722.00	40,525.00	85	48,157.00	49,387.00	51,000.00	1
2	22,213.00	15,151.46	68	20,377.36	12,988.90	65	22,236.58	14,461.16	65	20,555.00	23,501.00	115	26,619.00	27,319.00	34,000.00	2
3	12,052.00	15,166.80	126	14,866.74	10,784.59	74	12,893.10	10,680.31	83	23,335.00	16,511.00	71	24,784.00	25,424.00	27,000.00	3
4	9,366.00	11,108.64	118	11,199.25	4,851.03	43	10,909.01	6,262.91	58	10,513.00	10,316.00	98	10,180.00	10,430.00	10,500.00	4
5	9,179.00	6,517.75	71	10,008.90	9,190.08	90	10,825.83	9,785.97	90	16,379.00	15,500.00	95	15,623.00	15,963.00	16,500.00	5
6	21,111.00	13,789.48	65	36,394.19	14,793.53	41	36,831.52	15,600.83	42	25,528.00	19,989.00	78	29,815.00	30,845.00	36,000.00	6
7	16,057.00	40,726.47	254	22,997.13	26,510.36	115	26,207.88	27,199.22	104	15,389.00	15,136.00	99	18,616.00	18,896.00	22,500.00	7
8	8,325.00	9,790.89	118	10,111.88	10,112.93	100	11,600.99	17,159.67	148	13,944.00	12,549.00	90	12,297.00	12,517.00	14,000.00	8
9	10,254.00	103.84	1	12,366.35	501.50	4	11,600.33	253.25	2	10,121.00	9,074.00	90	11,909.00	12,054.00	14,000.00	9
10	8,869.00	4,348.49	49	9,636.52	252.13	3	9,466.59	5,636.24	60	11,598.00	3,368.00	29	11,139.00	11,259.00	12,000.00	10
11	9,957.00	3,199.40	32	11,663.53	9,107.29	78	12,429.87	4,750.03	38	11,507.00	9,836.00	85	11,622.00	11,772.00	12,000.00	11
12	13,027.00	4,515.72	35	12,673.22	20,570.85	162	13,386.50	12,599.61	94	9,970.00	9,034.00	91	11,709.00	11,939.00	14,000.00	12
13	13,311.00	26,108.19	200	15,417.82	22,813.23	148	16,681.31	27,247.68	162	18,240.00	25,861.00	142	21,046.00	21,681.00	25,000.00	13
14	15,847.00	11,189.84	70	16,627.59	10,671.52	64	16,232.33	4,280.30	26	16,142.00	10,890.00	67	17,843.00	18,283.00	20,000.00	14
15	8,084.00	4,173.81	52	11,280.20	6,389.17	56	12,060.99	5,061.43	42	12,743.00	8,790.00	69	15,344.00	15,614.00	18,500.00	15
16	8,477.00	12,802.98	151	8,461.63	969.34	11	8,820.78	5,043.46	57	8,973.00	4,193.00	47	9,205.00	9,335.00	10,000.00	16
17	13,251.00	4,201.50	32	13,772.18	9,057.43	65	11,805.48	8,663.29	73	13,901.00	6,441.00	46	12,103.00	12,273.00	14,000.00	17
18	22,477.00	18,249.19	82	22,304.40	21,484.66	97	24,579.87	17,034.60	70	38,164.00	29,996.00	78	42,990.00	44,155.00	50,000.00	18
19	17,042.00	2,783.23	16	20,292.73	12,066.05	60	20,395.09	11,286.90	55	24,584.00	14,295.00	58	23,607.00	24,337.00	25,000.00	19
20	16,499.00	15,737.03	95	21,621.48	20,700.44	95	21,164.55	9,556.61	45	17,124.00	3,576.00	21	18,250.00	18,490.00	20,000.00	20
21	15,794.00	12,243.00	77	25,483.99	18,596.07	73	25,525.33	11,389.94	45	28,184.00	13,943.00	50	31,839.00	33,049.00	38,000.00	21
22	12,847.00	3,300.58	26	15,135.70	5,828.67	38	13,338.35	11,504.79	86	15,890.00	12,349.00	78	14,746.00	15,006.00	16,000.00	22
23	9,843.00	2,756.49	28	10,805.99	4,863.17	45	10,959.43	2,101.10	19	14,208.00	10,621.00	79	19,049.00	19,359.00	24,500.00	23
24	11,104.00	1,294.40	12	10,031.64	2,097.24	21	9,843.93	5,570.56	57	10,676.00	5,193.00	49	11,457.00	11,647.00	12,500.00	24
25	23,129.00	17,300.65	75	36,338.11	52,124.83	144	40,639.16	42,932.37	106	29,127.00	25,391.00	87	33,210.00	34,065.00	39,000.00	25
26	16,537.00	7,703.50	46	15,694.99	16,406.50	104	17,267.15	23,002.32	133	16,708.00	27,171.00	162	20,410.00	20,670.00	24,500.00	26
27	18,950.00	27,764.06	147	18,486.92	21,049.82	113	21,002.89	25,878.34	123	13,808.00	25,624.00	186	16,214.00	16,544.00	20,000.00	27
28	10,051.00	5,708.96	57	11,782.40	5,732.30	49	12,983.23	10,807.98	83	12,997.00	11,803.00	91	16,481.00	16,701.00	20,500.00	28
29	13,371.00	6,738.31	50	12,287.36	13,733.48	111	13,458.68	15,183.96	112	13,095.00	15,639.00	119	17,137.00	17,422.00	22,000.00	29
30	6,574.00	17,596.76	268	10,318.20	7,592.38	74	10,868.90	9,818.58	91	8,023.00	14,161.00	176	8,400.00	8,500.00	8,500.00	30
31	11,416.00	5,303.92	47	13,941.38	17,313.06	125	14,817.82	17,786.19	120	13,029.00	14,263.00	109	14,390.00	14,720.00	16,500.00	31
32	11,654.00	34,207.67	292	16,628.99	14,124.40	85	18,300.92	21,899.00	119	18,975.00	25,758.00	135	21,248.00	21,338.00	24,000.00	32
33	9,346.00	11,880.32	126	10,931.89	11,191.89	102	12,010.58	20,908.48	174	11,833.00	17,756.00	150	15,494.00	15,854.00	20,000.00	33
34	10,288.00	24,926.78	243	9,698.27	19,569.18	202	12,173.52	17,391.67	143	10,448.00	21,474.00	205	12,226.00	12,746.00	15,000.00	34
35	10,193.00	14,412.37	142	12,495.93	15,984.51	128	13,687.84	14,414.08	106	13,308.00	17,425.00	130	15,957.00	16,282.00	19,500.00	35
Totals & Percents	$500,186.00	$482,052.15	92	$560,213.02	$483,245.88	86	$586,157.44	$490,240.10	84	$596,832.00	$547,969.00	92	$681,216.00	$678,176.00	$786,500.00	

ESTIMATED COSTS by WARDS of MAINTENANCE and REPAIRS of PAVEMENTS OUT of RESERVE for 1914, TABLE XV. AND ESTIMATED COLLECTIONS of WHEEL TAXES for 1914

INVESTIGATION of BUREAU of STREETS — DEPARTMENT of PUBLIC WORKS

WARD	ASPHALT	BRICK	CONCRETE	CREOSOTE BLOCK	GRANITE	MACADAM OILING & SCREENING	MACADAM REPAIRS	MACADAMIZING CEDAR BLOCK	COUNTRY ROADS	TOTAL	% of TOTAL	TOTAL MACADAM REPAIRS & MACADAMIZING CEDAR BLOCK	TOTAL EXCLUSIVE OF MACADAM R'PRS & MACADAMIZING CEDAR BLOCK	% of TOTAL	ESTIMATED WHEEL TAX COLLECTION 1914.	WARD
1	$17010	$3130			$26450	$ 750	$ 500	$6630		54470	541	7130	$ 47340	1033	$51000	1
2	11870	1210	$180		50	4800	3180	4690		25980	259	7870	18110	396	34000	2
3	2800	880	400	$720	120	5760	3530	6170		20380	203	9700	10680	232	27000	3
4	2880	670			700	820	820	4020		9910	099	4840	5070	111	10500	4
5	1040	50			2000	1460	1800	19840		26190	259	21640	4550	099	16500	5
6	1990	750		180	50	11470	8200	11130		33770	335	19330	14440	316	36000	6
7	3150	360				10350	5000	8160		27620	275	13160	14460	316	22500	7
8		540				8340	7650	13160		29690	296	20810	8880	194	14000	8
9	1420	500	170			22000	4000			28090	279	4000	24090	525	14000	9
10	3330	1070			240	40	40	1000		5720	057	1040	4680	102	12000	10
11	1720	1650			600	280	390	4080		8720	088	4470	4250	094	12000	11
12	2150	230	670		140	1070	1410	15710		21380	212	17120	4260	094	14000	12
13	18000	1150			40	470	460	22900		43020	429	23360	19660	428	25000	13
14	6910	2920	20		370	560	520	7850		19150	190	8370	10780	235	20000	14
15	4420	1140			290	580	570	22300		29300	291	22870	6430	141	18500	15
16	3630	400			500		100	960		5530	055	1060	4530	099	10000	16
17	3360	3580	20		170		30	16900		24060	239	16930	7130	157	14000	17
18	12520	6000	30		8000	190	220	6530		33550	333	6750	26800	585	50000	18
19	8210	7090	30		1500	50	60	1090		18030	179	1150	16880	369	25000	19
20	6870	2070			1330	20	30	2090		12410	123	2120	10290	225	20000	20
21	10990	2830	100		5000	1150	720	680		21470	214	1400	20070	438	38000	21
22	6120	4100			3500	80	100	2680		16580	165	2780	13880	304	16000	22
23	4510	2060				3570	2630	5310		18060	180	7940	10120	221	24500	23
24	270	100			230	920	900	20540		22960	228	21440	1520	033	12500	24
25	3140	20	90			20130	9000	17740		50120	499	26740	23380	511	39000	25
26	4500	430				13350	9000	6410		33690	334	15410	18280	398	24500	26
27	630	450				8450	9340	10930		30400	302	20870	9530	209	20000	27
28	2250	170			460	1130	1280	19170		24460	243	20450	4010	088	20500	28
29	1340	1100			250	5500	4780	33940		46910	465	38720	8190	179	22000	29
30	1340	2130			190	3930	3460	49760		60810	605	53220	7590	167	8500	30
31	690	1650				12810	5000	31910		52060	518	36910	15150	331	16500	31
32	930	880				25920	10000	18740		56470	560	28740	27730	605	24000	32
33	2650	1750			60	9190	4000	22160		39810	396	26160	13650	298	20000	33
34	4000	300				5280	5120	13800		28500	283	18920	9580	209	15000	34
35	3600	1020				7120	2000	13130		26870	267	15130	11740	257	19500	35
Total	160240	54960	1770	900	52240	187540	106440	442110	41250	1047450 *	1000	548550	* 498900	1000	766500	Total

NOTES — The estimate is based upon the cost of maintaining and improving different kinds of pavement out of reserve based upon traffic of street, character, use and physical condition of pavement and location of ward
— Under the Ordinance, 15% of the total wheel tax collection is to be expended at the discretion of the Commissioner of Public Works, for the improvement of through routes. This amount is estimated at $ 114,375.00 for 1914 and is not included in the above estimates segregated by wards
— Overhead expenses, including general superintendence, purchase and maintenance of equipment and supplies, estimated at $ 50,000, not included in the above segregated estimate

* * Total contains estimate of $ 41,250 for maintenance of country roads, not segregated by wards

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street and alley intersections and emergency ditching. The nature of the work done is of such indefinite character that estimates of the amount required in the different wards at best have been approximations.

Analysis of the records of the amounts spent during the past few years and the work which remains to be done in the repairing of plank sidewalks, intersections and unimproved streets furnished a fair basis upon which emergency appropriations may be made for next year. In a general way the inner central wards require minimum amounts, while the outlying wards require maximum amounts.

Emergency Repair of Streets and Alleys.

Improved pavements which are not under reserve are kept in repair from moneys obtained from the vehicle tax fund. The amounts collected and estimates of percentage expenditures for such repair work in each ward for 1914 are given under the heading of "Standard and Estimates for Street Repairs."

Outside of the repair of pavements out of reserve, the Bureau of Streets is called upon to care for unimproved streets and alleys and emergency repair of improved streets under reserve. Macadam, cedar block and other unimproved streets and alleys are repaired by the ward superintendents with their own force of laborers.

Public utility corporations which have service pipes and conduits laid under the surface of pavements tear up pavements from time to time to make additions or repairs to their properties. Such openings are repaired at the expense of the corporations. The tearing up of improved streets costs the city large amounts of money each year and decreases the life of such pavements. The practice which has been followed in many European cities of the construction of tunnels under parkways and sidewalk areas rather than in the street is being extended in cities in this country. These tunnels or conduits contain all service pipes, sewers, telehone lines, water mains, etc., and this arrangement allows of more economical upkeep and longer life of the street pavements and decreases the cost for necessary repairs and additions to public utility properties which are made necessary from time to time.

The estimates of the appropriations for the emergency fund given under Table III include the amounts necessary for emergency needs for improved streets, emergency ditching and repair of plank sidewalks. The estimates for emergency fund to care for unimproved streets and alleys, emergency ditching and emergency work on improved streets were based on the conditions found in the different wards.

Repairs of Plank Sidewalks.

There still remain about 310,500 square feet of plank sidewalks in different sections of the city. While no new plank sidewalks are now being built, it is necessary to make provision for emergency repairs to old plank sidewalks until they are replaced by permanent concrete walks. Until these plank walks are replaced by permnaent walks, it is considered advisable to have the superintendent in charge of each ward care for such work as emergencies arise.

In estimating the amount necessary for this emergency work, it has been assumed that the average life of a plank sidewalk is about five years. The estimate for each ward has been included under the column Emergency Fund given in Table III.

The following is a detailed statement of the square feet of plank sidewalk now found in the different wards of the city:

Ward.	Sq. ft. plank walk.
4	450
8	168,084
9	3,000
11	55,440
16	6,000
17	34,000
21	3,000
22	8,874
32	31,680
Total, all wards	310,528

Cement Sidewalk Intersections.

Cement sidewalks have been built by special assessment or by private contract in different parts of the city where the intersections at street crossings from the street lines to curb lines have not been included. As a result, there are about 1,320 sidewalk intersections in the city which are unimproved and unpaved. The records of the bureau of streets show that there still remain 4,260 lineal feet of curb and gutter repairs and 166,560 square feet of cement sidewalk which have to built. These are distributed as follows:

Ward.	No. of intersections.	Total sq. ft.	Lin. feet, curb.	Lin. feet, gutter.
1	...	3,259	...	...
2	10	824	...	...
3	...	....	...	...
4	6	772	...	...
5	14	517	...	...
6	16	322	...	...
7	29	912	...	...
8	214	26,149	...	...
9	98	10,818	...	...
10	96	6,758	608	444
11	15	968	121	...
12	...	....	...	...
13	14	178	...	...
14	35	1,595	...	...
15	1	120	...	...
16	25	20,214	778	...
17	30	4,330	...	...
18	12	48	24	...
19	9	371	59	...
20	21	2,690	30	...
21	24	2,038	...	...
22	11	1,227	20	...
23	20	593	20	...
24	36	1,631	...	...
25	8	1,080	...	...
26	6	342	...	...
27	159	58,984	2,156	...
28	16	624	...	...
29	81	3,725	...	...
30	69	2,227	...	...
31	134	8,722	...	...
32	51	3,120	...	...
33	...	....	...	...
34	11	1,210	...	...
35	51	192	...	...
Totals	1,322	166,560	3,816	444

The area given for sidewalks for repairs or construction in the Sixteenth Ward includes 18,583 square feet of subway sidewalk. The 778 lineal feet shown consists of curb work in subways. The 48,062 square feet of sidewalks for repairs or construction in the Twenty-seventh Ward consists of the sidewalks to be built in subways. The 2,156 lineal feet of curb is also for work in subways.

The average cost of sidewalks built in 1912 by the Bureau of Streets was 10.7 cents per square foot and the average cost of concrete curb repair 34 cents per lineal foot. These average costs are low compared with average contract prices, and probably lower than if done under separate ward organizations. Upon the basis of 1912 costs, it is estimated that the cost of cement sidewalk will amount to $18,500 and $170 for the concrete curb repairs, which amounts should be provided for in the 1914 budget so that this work may be completed expeditiously and economically.

UNIFORMS FOR EMPLOYES.

Inquiries were directed to the largest cities in this country, the three main city park systems and private improvement associations in the city relative to the practice, cost and effect of uniforming employes engaged in the cleaning of streets and alleys,

TABLE XVII

DATA FROM AMERICAN CITIES RELATING TO UNIFORMING OF STREET CLEANERS AND REFUSE DRIVERS

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CITY	Av.No. men	Uniform	Makeup of uniform	Quality and color	Av.life of unif	Helmet or cap	Leggins	Owned by	Cleaned by	Driver of ref. wagn
NY, N.Y.	60	None								
IMORE, MD.	310	Uniform	Coat, trousrs and helmet	White duck	3 yrs	Helmet	None	St. cleanrs	St. cleanrs	Uniform
ON, MASS.	590	Uniform	Coat, trousrs helmet or cap	Khaki	6 mos	Hat & cap	None	City	St. cleanrs	U.S.A.hat no badge
AGO, ILL.	1220	None								None
INNATI, O.	175	None								None
ELAND, O.	450	Uniform	Trousers and jumper	White canvas		Cap	None	St. cleanrs	St. cleanrs	None
MBUS, O.	123	None								None
OIT, MICH.	300	110 labrs unifmd	Trousers and jumper	White cotton		Brown felt hat	None	St. cleanrs	St. cleanrs	None
D RAPIDS, MICH.	75	Uniform	Jacket, trsrs and helmet	Govt. khaki	6 mos.	Helmet	None	St.clnr: hl.city	St. cleanrs	None
NAPOLIS, IND.	275	None								None
AS CITY, MO.	225	Uniform	White duck coat & trs.	White duck	2 mos.	Helmet Straw hat	None	St. cleanrs	St. cleanrs	None
AUKEE, WIS.	250	Unif.in bus.dist	Trousers and jumper	White duck	6 mos.	Ordinary hats	None	St. cleanrs	St. cleanrs	None
EAPOLIS, MIN.	425	Uniform	White suits	White	3 mos.	Soft felt hat	None	St. cleanrs	St. cleanrs	None
ORLEANS, LA.	340	Uniform	Alpine hat, coat & trs.	Gray hat white suit		Hat	None	St. cleanrs	St. cleanrs	Red shirt jean trs black hat
YORK:-										
r.of Richmond	96	Uniform	Coat & trsrs hat;cap winter	White duck	1 yr.	Brn.St.hat: leath.cap	None	St. cleanrs	St. cleanrs	Uniform
r. of Queens	196	Uniform	Coat, trsrs and cap	White (no specific)	1 yr.	Caps		St. cleanrs	St. cleanrs	Uniform
r. The Bronx	930	Uniform	Coat, trsrs & cap; helmet	White duck "Our Own Mfg"	6 mos.	Hlmt. cap: with ear protectrs	Rbr.hip: boots; strm.cap	St. cleanrs	St. cleanrs	
r. Manhattan	2800	Uniform	Shirt, jumper and trsrs	White jeans	1 yr.	Helmet & cap	None	St. cleanrs	St. cleanrs	Uniform
A, NEB.	42	Unfform	Jackets & trs.	White	Do not know yet	What they prefer	None	St. cleanrs	St. cleanrs	None
ADELPHIA, PA.	1115	Uniform	Hat, coat & tr	White	No.rec.	Helmet in sumr; cap		St.clng: contr.	St.clng: contr.	Uniform
DENCE, R.I.	190	Uniform	Khaki blouse & trsrs	Tan; medium quality	6 mos.	Helmet in sumr; cap	None	City	St. cleanrs	None
LAND, ORE.	225	Uniform	Trousers & jacket	White denim	10 mos.	Helmet	None	City	City	None
CSTER, N.Y.	125	None								None
FRANCISCO, CAL.	170	None								None
T. JOSEPH, MO.	24	Uniform	Coat & trsrs.	White duck	3 pr yr	Straw hat	None	St. cleanrs	St. cleanrs	None
DO, O.	45	Uniform	Coat, trs.cap	White duck	1 yr.	Hat	None	St. cleanrs	St. cleanrs	Brn.dk.ct trs.& cap
SNGTON, D.C.	400	Uniform	Cap, coat, trsrs	White duck	No. rec	Helmet	None	St. cleanrs	St. cleanrs	None
CHICAGO PARKS										
ou Park Board	42	Uniform	Coat, trs.hlmt	10 oz.whi.dk.	3 mo.	Helmet	None	St.clnr	St.clnr	Green cl.
in ln Park Board	40	Uniform	Coat, trs. cap	Med.wt.khaki	6 mo.	Straw; fur lined cap	None	Pk. Bd.	Pk. Bd.	None
os Park Board	57	Uniform	Trs.jacket, cap	White duck	No rec.	Cap	None	St. cleanrs	St. cleanrs	None

EFFICIENCY DIVISION - CIVIL SERVICE COMMISSION

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and the collection of city refuse and waste. The data collected from these sources has been analyzed and tabulated, and is shown in Table XVII.

It will be noted from this table that of the 24 cities which reported, 19 require that street laborers wear uniforms. The three city park systems, viz., the West Park, Lincoln Park and South Park systems, and the Citizens' Street Cleaning Bureau of this city also have their street employes in uniforms. It will be further noted that of the cities and the city park systems which have their laborers uniformed, only four cities and one park system furnish uniforms for their employes, and with the exception of one city and the Lincoln Park Commission, the uniforms are not washed by the city or park systems.

It is common to refer to the "white wing" brigades in street cleaning forces in the larger cities of this country as distinguished from the ordinary laborers employed by private companies. The practice and need of having employes in the police, fire and similar service uniformed is now recognized everywhere. The pride of the men in their work, the publicity and moral effect on the citizen body have been found to be greatly increased where the public employes are clothed in uniforms.

The consensus of opinion, as indicated in the reports received from these municipalities, is that the uniforming has a good effect upon the efficiency of the employes, and as a publicity proposition, tends to increase the interest of the public and esprit de corps in the organization. It tends to prevent the assembling and loafing of laborers and drivers by making them conspicuous, and at the same time makes the citizen body and the employes realize the importance of the work.

Outside of the above considerations, uniforming of the street laborers furnishes them with greater assurance against injury from vehicles and street railway traffic. This is an important consideration when the number of injuries and deaths to street cleaners where they work in their ordinary clothes are considered. Analysis of the records of the number of laborers employed by the Bureau of Streets of this city, who were injured during the year ending August 31, 1913, shows that there was a total of 105 accidents, of which six were fatal. The remaining 99 lost approximately 1,600 days because of the injuries received while engaged in the performance of their work.

The employes engaged in the Bureau of Streets and the city of Chicago would mutually benefit by the inauguration of the system whereby all permanent city employes working as street cleaners, rubbish and garbage drivers, foremen and street inspectors, would be uniformed. It is accordingly recommended:

(a) That all regular street cleaners in the city service be uniformed in white duck uniform, consisting of jacket, trousers, and a light white duck cap for summer, and a lined white leather cap with ear tabs for winter.

(b) That all regular garbage drivers, garbage helpers, rubbish drivers and helpers, and all employes engaged at or around the dumps, loading stations, etc., be uniformed in a suit consisting of khaki jacket or shirt, trousers, and a cap of the same color.

(c) That all foremen and field inspectors supervising the work of laborers in the wards and in and about the dumps be uniformed in a suit, and during the winter months in an overcoat, of blue uniform material and a black fedora hat, indicating the rank and authority of the position.

(d) That these uniforms be purchased by the city and distributed to the laborers at cost. All uniforms to be washed and maintained by the employes.

(e) That all foremen field inspectors, regular street cleaners, and garbage and rubbish drivers and helpers be furnished with numbered badges having inscriptions of the name of the department and bureau by whom they are employed. These badges to be returned by such employes when their services with the city are discontinued.

(f) That it be the duty of one of the staff working under the direction of the Second Assistant Superintendent of Streets to make regular inspections of cleanliness and condition of uniforms worn, in addition to the inspectional work done by the Ward Superintendent, and that the condition of uniform should be a factor in grading individual efficiency according to the rules of the bureau

It has been ascertained that the white duck suit for street cleaners as above recommended can be purchased at about $18.00 per dozen suits. White duck caps for the same use can be purchased for about $9.00 per dozen, and a lined white leather cap with ear tabs can be purchased for about $12.00 per dozen.

The khaki uniforms, recommended for garbage drivers and helpers, rubbish drivers and helpers, and all employes engaged in and around the dumps, loading stations, etc., can be purchased at about $24.00 per dozen. Khaki caps for summer wear can be purchased at about $9.00 per dozen, and a heavy lined, upstanding corduroy cap with ear tabs for winter can be purchased at about $4.00 to $6.00 per dozen.

The blue uniform recommended for foremen and field inspectors can be purchased for about $11.00, and the overcoats at about $13.00 apiece. Serviceable fedora hats can be purchased at about $15.00 to $18.00 per dozen.

It is probable that when the above are bought in large quantities the cost could be greatly reduced. An appropriation of $22,000.00 should be provided in the 1914 city budget for the purchase of uniforms—this amount to be returned to the city after they are distributed to and money for same collected from the employes.

Specifications for the above uniforms have been prepared and are included in Appendix "B."

USE OF MOTOR TRUCKS AND TRACTORS.

Inquiries have been made as to the adaptability and economy of motor trucks in connection with the hauling of city refuse and crushed stone and other material for the repair of streets and alleys. Tests have been made on various kinds of motor trucks in different cities of the country with varying results, and inquiries have been directed to different municipalities and motor truck companies and several tests made in this city to determine the following:

1—The relative economy of hauling refuse and street repair materials by motor trucks and by teams.
2—The kind of motor truck best adapted for this purpose.
3—The practicability and economy of discarding present equipment and the purchase of motor trucks.

The matter of the relative economy in the use of motor driven and horse drawn vehicles for different lengths of haul has been treated by Mr. R. T. Dana, member American Society of Civil Engineers, who shows the variation in cost per ton for different lengths of haul from one-quarter mile to ten miles and the savings that would result in the use of motor drawn vehicles. Following are his summary figures:

Loaded Haul:	Cost per ton.		Cost per ton-mile.		Per cent saving by using motor-drawn vehicle
Miles.	Horse-drawn vehicle.	Motor-drawn vehicle.	Horse-drawn vehicle.	Motor-drawn vehicle.	
¼	$0.16	$0.19	$0.640	$0.760	—18.8
½	.22	.24	.440	.480	—9.1
1	.32	.32	.320	.320	0.0
2	.50	.48	.250	.240	4.0
3	.70	.62	.233	.207	11.2
4	.90	.79	.225	.198	12.0
5	1.09	.96	.219	.192	12.3
6	1.29	1.12	.215	.187	13.0
8	1.68	1.44	.210	.180	14.3
7	1.48	1.28	.211	.183	13.2
9	1.88	1.60	.209	.178	14.7
10	2.07	1.77	.207	.177	14.7

Similar investigations have been made at the Massachusetts Institute of Technology and the following summary shows the relative cost of operating the horse drawn, gasoline and electric commercial vehicles, based upon the different sizes of vehicles:

Size of vehicle.	Number of miles traveled for expenditure of $1.		
Tons.	Horse-drawn.	Gasoline-driven.	Electric-driven.
½	3.9	3.6	4.3
2	2.9	2.6	3.1
3½	2.2	2.3	2.7
5	1.7	1.9	2.2

Further analysis has been made on the actual economies that may be expected by the use of this equipment under conditions existing in this city and the relative adaptability of the gasoline and electric motor trucks for the work that may be required in this city has been analyzed. The following table gives a detailed comparison of the advantages of each:

Gasoline Truck.	Electric Truck.
(a) Greater average speed possible.	(a) More efficient where the short haul with many stops are encountered.
(b) Can be run continuously night and day.	(b) More efficient within its limits of operation, which approaches from 50 to 60 miles per eight-hour day.
(c) Are essential outside of the radius of operation of the electric truck.	(c) More economical motive power.
(d) Can do more work in a given time if speed restrictions do not interfere.	(d) Less average per cent maintenance and repair costs.
(e) To properly care for batteries requires the services of a man more difficult to obtain than in the case of gasoline motors.	(e) Less per cent depreciation.
(f) Less balking on unimproved streets.	(f) Requires less skill to drive.
	(g) Affected less in winter by temperature.

In making an estimate of the cost of hauling, the following assumptions as to cost of operation, interest and depreciation on investment have been taken into account:

Interest on investment, 4%.

Insurance and fire liability (gasoline), 3%.....$70.00 per annum
(electric), 3%..... 63.00 per annum
Garage ..... 25.00 per month
Compensation of driver (3-ton truck)..... 80.00 per month
Depreciation gasoline truck, estimated life 75,000 miles on truck value minus tires.
Depreciation on electric truck, estimated life 100,000 miles on truck value minus tires.
Tires—Depreciation based on guarantee, 8,000 miles.
Contingencies—Covering interest on general operating stores, repair materials, general superintendence, etc., 2% of the first cost.
Antiquasion—Estimated as a fixed charge, it being a factor which decreases the value of equipment due to improved methods in the science of construction, 5%.
License—State license paid by the city, $4.00 per year for 3-ton truck.
Operating values—Taken from actual results obtained in the operation of 14 standard gasoline trucks, 100 electric trucks, and data obtained from the Massachusetts Institute of Technology, Experimental Work:

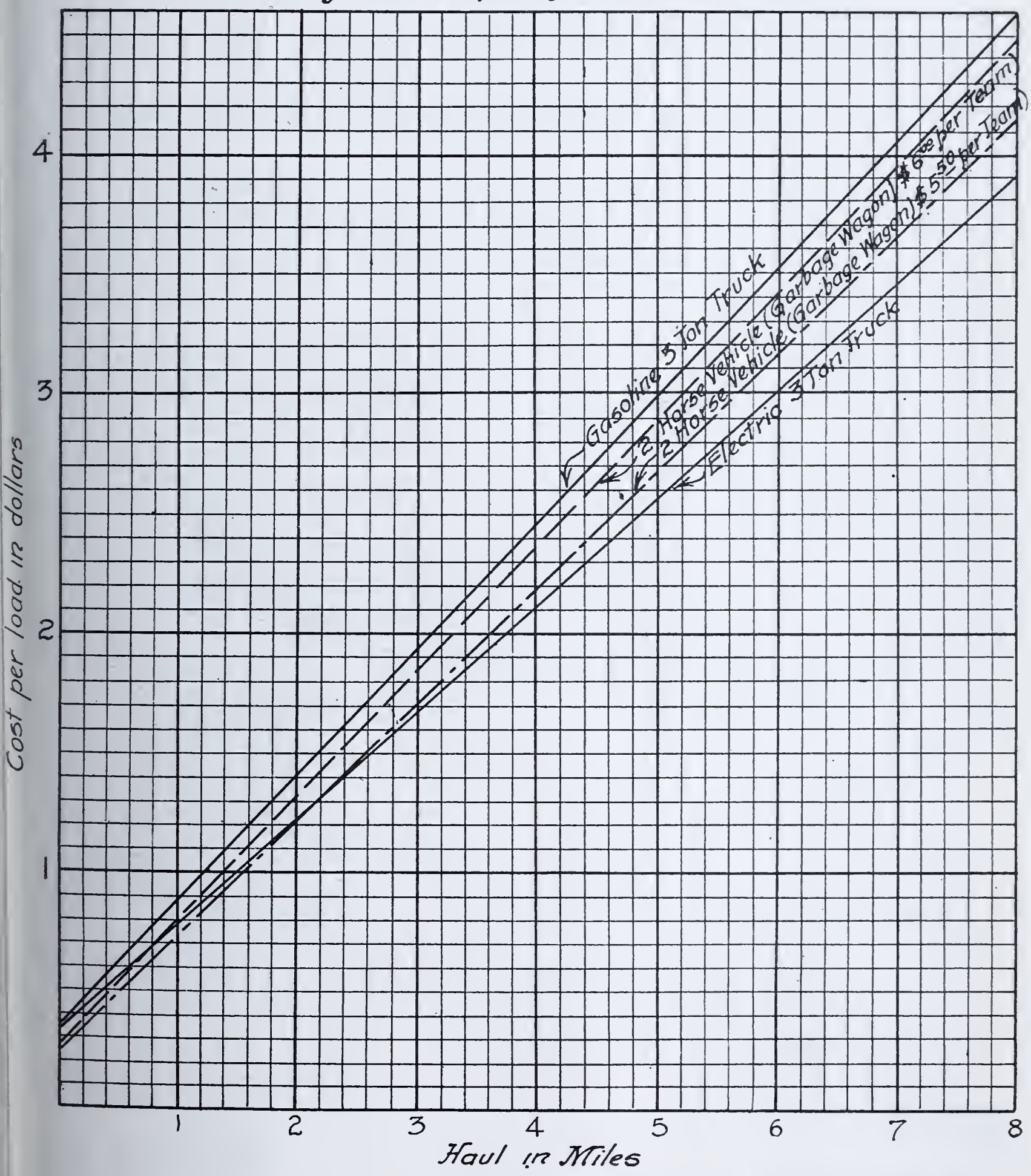
Size of truck.	No. of miles per gal. for gasoline cars.	No. of K. W. hours per mile for electrics.
2-ton	5.00	.741
3-ton	3.92	.903
4-ton	3.20	1.064
5-ton	2.70	1.225

Assuming that a three ton truck is loaded to full capacity, an estimate based upon the above assumptions was made of the cost per mile of hauling refuse as compared with the present cost of hauling by two horse garbage wagons which are now contracted by the city at the rate of $5.50 per day. Similar estimates have been made on the basis of hiring garbage teams at $6.00 per day. The results of these analyses are shown in Plate XIX, which has curves of the relative economy of the three types of vehicles of three ton capacity for different lengths of haul.

Tests have been made during the past year on the use of motor trucks for hauling crushed stone and material for the street repair work. It was found that the conditions entering into the hauling by motor trucks for such work are generally favorable to the use of motor trucks, as the time required to load and unload is relatively small, the travel of the truck is confined almost entirely to streets, and the maximum length of haul was within the province of electric trucks.

PLATE XIX

CURVES SHOWING HAULAGE COSTS for HORSE DRAWN, GASOLINE & ELECTRIC DRIVEN VEHICLES of THREE TON CAPACITY for HANDLING of GARBAGE.



Efficiency Division
Civil Service Commission

PLATE XX

INVESTIGATION of BUREAU of STREETS
DEPARTMENT of PUBLIC WORKS

Curves showing miles per day, cost per ton-mile & cost per ton delivered, for different length hauls for street repair work.

---- Horse-drawn stone or asphalt wagon.
—·— 5-Ton gasoline truck.
——— 5-Ton electric truck.

Gasoline Truck - Average Speed = 8.5 m.p.h.

Electric Truck - Average Speed = 7.0 m.p.h.

Miles per day

Miles per day

Cost per Ton-mile

Gasoline Truck working 180 days per year

Stone Wagon @ $6.00 per day

Electric Truck working 180 days per year

Asphalt Wagon @ $6.00 per day

Gasoline Truck working 300 days per year

Electric Truck working 300 days per year

Miles per day

{ 2 Horse 7500 lb. Stone wagon or
2 " 8900 " Asphalt Wagon.
Average Speed = 2.7 mi. per hr.

Cost per Ton delivered

Efficiency Division
Civil Service Commission

Miles per day

Cost per Ton-Mile

Length of Haul

In estimating the probable economy of the transportation of pavement material by the use of motor trucks, the following assumptions have been made, based upon the experiences and requirements in this city.

1—That five-ton trucks will be used.
2—That these trucks be equipped with dump bodies.
3—That the time required for loading and unloading will be five minutes.
4—That each truck will be in actual use seven hours per day, thus being liberal for necessary delays in traveling, loading, etc.
5—That an average speed of seven miles per hour can be maintained by electric motors; eight and a half miles by gasoline trucks.
6—That the other charges entering into the cost of operation are the same as the assumptions for three-ton trucks estimated for garbage service.

The following assumptions were considered in estimating the economy of the use of horse-drawn vehicles for hauling the same materials:

1—Capacity of stone wagon.....7,500 pounds
Capacity of asphalt wagon.....8,900 pounds
2—Time required for loading or unloading.....5 minutes
3—Average speed of wagon.....2.7 miles per hour
4—Cost per day—wagon, team and driver.....$6.00

Analysis of the estimates has been made and curves showing miles per day, cost per ton load and cost per ton delivered in street work based on the above assumptions are shown in Plate XX. These curves show that the use of motor trucks is more economical than horse drawn vehicles when same are used for a period of at least 300 days per year in the transportation of crushed stone, asphalt and other street repair materials. If the period in which the transportation equipment is used is less than 180 days each year, which is the minimum period in which street repair work will be made during any year, the use of horse drawn asphalt wagons is more economical and the use of horse drawn wagons for hauling crushed stone is less economical than any type of motor truck. The curves further show that in order that the cost in using electric trucks instead of asphalt wagons be equalized, the electric truck must operate at least 230 days each year and the gasoline truck must operate at least 260 days each year. Under favorable conditions, the motor trucks would be more economical than horse-drawn vehicles for the transportation of crushed stone and asphalt and the use of electric trucks will probably show a saving of approximately 25%.

The study of the economy and adaptability of the use of motor trucks for hauling garbage and other city refuse as shown above and in the curves on Plate XIX has led to the following conclusions:

1. That at the present prevailing cost of team hire, the saving in the use of electric motor trucks for hauling garbage in such wards as have a considerable haul, would amount to 5.1% of the total cost of removing such garbage by teams.
2. That if the cost of teams were increased to $6.00 per day the total estimated saving by using motor trucks for hauling would be about $15,775 per year or 12.3% of the total estimated cost of teams at $6.00 per day.
3. That inasmuch as these estimates are computed on the eight hour day basis, and that the present working period of garbage teams rarely amounts to eight hours per day, and often the working period is as low as six hours, that the saving which could be expected would exceed the percentage given.
4. That either the gasoline or electric power truck can handle the hauling of garbage with comparative ease and with approximately equal satisfaction.
5. That the more economical power truck has been found to be electric. This is governed in a measure by the low rate of cost of electrical energy from the Sanitary District to the city for night power, and by the fact that the collected data on the electric truck have shown lower per cent rates for depreciation, maintenance, repair and insurance than for the gasoline truck.

6. That the haul below which an electric truck, carrying 3 tons, would not be economical when measured against a $5.50 per day team is found to be about 1.8 miles, and when measured against a $6.00 per day team is 0.8 miles.
7. That the three ton gasoline truck at present cost price would not haul as economically, when traveling in the city at the economical rate of speed, as would the horse-drawn vehicle at either $5.50 or $6.00 per day, and traveling at the rate of speed found by experiment on garbage wagons.

In all discussions regarding motor driven vehicles for the collection of garbage and refuse it must be borne in mind that there are but 110 miles of improved alleys in the city out of a total of 2,028, and that until the percentage of paved alleys is materially increased the adoption of motor vehicles for such work seems impracticable.

The present length of haul of garbage and refuse can, however, be greatly decreased by the provision of additional local stations and plants in the different sections of the city, to which the materials may be transported by the street railway cars or by motor tractors driven through the streets. The use of motor tractors which will transport the wagons to these stations and plants will greatly decrease the cost of present haul and increase the garbage and rubbish service. It is recommended that provision be made in the 1914 appropriation ordinance for the purchase of a sufficient number of motor tractors for the hauling of refuse and garbage from stations to local incineration and disposal plants.

The above studies indicate clearly the economy in the use of motor trucks for the haul of crushed stone and other materials for street repair work. The repair division of the Bureau of Streets could use to good advantage such modern equipment and an appropriation for at least two five-ton trucks should be provided for in the 1914 appropriation ordinance.

EQUIPMENT AND SUPPLIES.

As hereinbefore noted, the efficiency and quantity of service rendered by the Bureau of Streets has been curtailed to a considerable extent because of lack of sufficient modern equipment and better supplies. The additional expenditure of a relatively small percentage of the total appropriation in the purchase of additional equipment and supplies would greatly increase the efficiency and economy of the work and would tend to increase the service now furnished throughout the city.

The congestion resulting from the lack of sufficient equipment at the rubbish and garbage loading stations, at the disposal plants and dumps results in considerable loss of time and generally hinders the operation of uniform schedule service in refuse collection and cleaning of streets and alleys throughout the city.

The increased value of land in the different parts of the city and filling in of dumps has caused a great increase in the length of haul for the removal of refuse and street dirt in many wards and the provision of additional refuse loading stations would greatly decrease the present cost of haul throughout the city.

With the extension of street repair work, it has been shown that economy would result by providing motor trucks for the hauling of crushed stone and other street repair materials and thereby increase the amount of repair work.

With the installation of the uniform street cleaning schedules throughout the city and with the requirement that the prescribed uniform standard of service be maintained, it has been shown clearly that additional supplies, such as street dirt boxes, scrapers, brooms, etc., would increase the standard of street cleaning service from 15% to 25%.

It has been found that the efficiency of street sweepers would be materially increased by the extended use of scrapers and wider brooms on smooth pavements. The use of street dirt boxes for the temporary storage of street dirt tends not only to remove objections due to dumping of street dirt in alleys and vacant lots, but also increase the time available for productive cleaning work.

In order that the efficiency and standard of service of street cleaning and repair and

refuse removal be maintained and further increased, provision should be made in the 1914 appropriation ordinance for the following equipment and supplies.

The estimates included herein for supplies and equipment for the various activities of the Street Bureau have been based upon the actual needs of each of the various sections of the city, the service to be rendered and upon the relative life of the equipment and supplies.

The following is an estimate of the cost of the equipment and supplies which should be included in the 1914 budget outside of the amounts included in the ward estimates:

Street Cleaning Equipment and Supplies.

Squeegee machines to be used on smooth pavements, 3 at $1,300	$ 3,900
Pressure flushing machines, 2 at $1,200	2,400
50-can carrying carts and 300 cans for use in collecting street dirt in congested districts	800
Additional street dirt boxes to be placed on the curb of the street for the temporary storage of street dirt, 6,000	15,575

Garbage Collection Equipment.

Improvement of Chicago avenue loading station by the construction of a reinforced concrete dock, re-arrangement of shops, new pavement, sewer drains and track facilities for the operation of a locomotive crane	$32,750
Locomotive crane for Chicago avenue loading station for unloading and loading garbage boxes and handling supplies and equipment in the material yard	5,000
Garbage wagon tanks to supplement present garbage tank equipment	5,000
Wagon gear for supplementing present equipment for the collection of garbage	6,750
and motors)	$12,000
Rubbish dump cars for use at Goose Island loading station	20,000

Street Repairs Equipment.

Construction of two asphalt plants, one to be located on the North Side, and the second on the South Side, for the purpose of reducing long hauls and to facilitate work in street repairs	$55,000

Rubbish and Ash Collection Equipment.

Construction of a loading station on Goose Isand near Division and Hooker streets to reduce the length of haul necessary for refuse and street dirt for adjoining wards (exclusive of cars	
Two motor trucks for hauling pavement material	10,000
Two road rollers to be used for improving macadam streets	4,800
Six 500-gallon tar tank wagons to be used in resurfacing roads and for the transportation of tar and oils	3,900
One portable asphalt plant for the utilization of asphalt in the repair of asphalt pavement	10,000
Sprinklers for oiling and necessary alterations of present oiling equipment	3,125
Asphalt wagons for the transportation of material from asphalt plants to repair work	4,375
One ton delivery auto for carrying oils, supplies, etc., from the central plant to repair work	1,800
35 tar wagons for use in connection with repair of macadam pavements	4,200
For the purchase of "street closed" signs to be used in connection with the repair of streets, 500	1,500
Two surface heaters for asphalt repairs, at $1,800	3,600

Estimates of appropriations covering the recommendations herein included for salaries, teams, etc., and supplies and equipment which should be provided for 1914, and for such other equipment, plants and sites as is required to bring about most economical and effective service, will be incorporated in the Bureau of Streets estimates for the 1914 appropriation ordinance.

The following table is the distribution of roller scrapers and street dirt boxes which are necessary for properly carrying on the street cleaning work of the various wards. The cost of the roller scrapers is included in the ward estimate for supplies shown in Table III.

Wards.	Roller scrapers.	Street dirt boxes	Wards.	Roller scrapers.	Street dirt boxes.
1	30	125	18	85	620
2	23	210	19	42	200
3	23	380	20	34	150
4	30	150	21	47	250
5	30	150	22	32	100
6	24	250	23	25	200
7	8	125	24	21	200
8	8	30	25	13	100
9	4	...	26	31	250
10	27	250	27	9	50
11	27	200	28	25	150
12	11	100	29	7	40
13	25	140	30	31	125
14	34	300	31	18	150
15	21	125	32	12	75
16	27	200	33	12	50
17	27	400	34	17	75
18	85	620	35	20	80
19	42	200			
			Total	860	6,000

REPORTS AND RECORD SYSTEMS.

In the analysis of records and accounts in the ward offices and central office to determine the unit costs of these activities, many different forms were found in use in the ward offices which were supplied either to the ward superintendents from the central office or made up by the individual superintendents as occasion demanded.

In most cases these forms developed with the growth of the work in the Bureau of Streets and little if any consideration has been given to the relation of one form to the other or to a uniform record system throughout the city. Many of the ward superintendents, in order to supply the deficiency which they believed existed and to obtain more complete and handy records for their own use, prepared and are using their "home made" forms, of which many were found to be excellent.

Analysis of these records show the general conditions obtaining in each ward but they are not sufficiently definite or uniform, nor have units been established in a manner to allow proper comparison and analysis. Because of the diversity of forms and lack of established units, a complete check on the accounts and charges which have been made at different times was not possible. Further study is now being made on this matter, upon which report will be submitted to the Commissioner of Public Works when completed.

The establishment of uniform standards and definite units for keeping records and a check on the efficiency of the work and organization is one of the fundamental principles of efficient and economical control of administration. With the establishment of such uniform records and definite units it will be possible to cost-figure the work and to compare results. In recording expenditures and the efficiency of the personnel it will be possible to so classify the data of expenditure as to show the cost of each organization unit, as well as the cost of carrying on each activity or group of activities performed by the organization units and the total cost for each division of the work in relation to the results obtained.

A study has been made of all the records and forms used by the different ward offices and the needs of the Street Bureau in carrying on the above activities in the different sections of the city, with the result that a complete set of forms for a closed record system of every activity has been devised. A description and copies of the forms proposed for this record system are given in Appendix "C" and on Plates XXVI to XXVIII, inclusive.

Many of the forms included in this appendix are based upon the best records found in the different ward offices. The complete set has been designed to accomplish the following:

(a) The installation of a uniform record system in all wards.
(b) The introduction of simple and definite forms which can be maintained by an average clerk.
(c) The reduction of all work and expenditures to definite units.
(d) The introduction of uniform sizes of forms so that they may be easily handled and easily compared.

While these forms cover the most important details of the bureau, minor changes may be required after they have been installed in the various ward offices. This closed record system should, however, be installed immediately throughout the city and no changes or additions should be made without the direction of the superintendent of streets and his assistants.

In connection with the record system it has been found that in view of the diversity and complex nature of the activities of the bureau, men more qualified in keeping records and segregating accounts should be provided to handle the ward clerical work in the central office and ward offices. At the present time, each of the ward records is prepared and kept by a laborer, who generally has little training or experience in that line. These laborers receive salaries varying from $2.25 to $2.75 per day. They should be assigned to field work and in their place provision should be made for qualified junior ward clerks at $840 per year to be obtained through civil service examination. This matter has been taken up in detail in the report submitted to the Commissioner of Public Works on changes in the present organization of the Bureau of Streets.

CO-OPERATION OF RESIDENTS—EDUCATION AND PUBLICITY.

The manner in which streets and alleys are cleaned and municipal wastes collected and disposed of directly affects every person in the community, and only through thorough co-operation with the municipal departments can this service and other services be performed most effectively and satisfactorily. It is essential that residents in each district of the city co-operate with the bureau and take a pride in keeping up and caring for streets and alleys and recognize the necessity for separating and treating garbage and refuse in the manner specified in the city ordinances.

Perhaps the most effective manner of obtaining strict compliance with the ordinances is through education and publicity. Excellent results have been secured in New York City, Boston and other eastern cities where such campaigns of education and publicity have been tried, and where the people have been made to see the importance and good results of strictly adhering to the ordinances providing for cleanly and sanitary conditions. It has been found that coercion on certain clases of people do not bring as good results as where they are shown the true light of the advantage of adhering to the ordinances. Strict compliance with the ordinances should, however, be required of these people after they have been given opportunity to know the requirements and true meaning of the ordinances.

An excellent method of bringing such problems right at home is that employed in many cities in providing for instruction of children in municipal sanitation and hygiene in the public schools. It is well known that children have considerable influence with their parents and prevail upon them when questions arise as to usage and laws. It is believed that if the importance of municipal sanitation is brought regularly to the attention of the children, the city will be made a cleaner city and municipal health greatly improved.

This matter was brought to the attention of the superintendent of schools, who in reply sent the following communication explaining the policy of the Board of Education in the matter of education and co-operation of school children in the care of streets and alleys and the disposition of city wastes:

> "The policy of general education of the citizen body in matters affecting sanitation is a very desirable one. Sanitation and cleanliness of the city

form an important part of the course of study in the elementary and high schools of Chicago. The following are selections from the course of study in the elementary schools:

" 'The aim in all grades should be to secure in pupils such habits as will contribute to their own health and the health of the community. The amount of instruction in anatomy and physiology should be small, but sufficient to make clear the value of hygienic practices.

" 'The value of pure air; the principal sources of impurities in the air; the necessity for cleanliness of the school buildings and other buildings; formation of habits of neatness; care of the toilet room seats.

" 'The work of the health department, the sewer system, the nature of contagious diseases, the means of guarding against them, the value of sunlight, avoidance of spitting in public places.

" 'The means of spreading contagion, antiseptic treatment of wounds, danger from bad housing, flies and mosquitoes, unclean water closets and defective sewers, value of parks.'

"One of the text-books in the series, used in connection with this course, is devoted largely to the consideration of the topics presented in your letter. The title of the book is 'Town and City,' published by Ginn & Co. An admirable text-book on Hygiene and Sanitation is the basis for the course of study in this subject in the first year of the high school. A great deal of instruction in the elementary schools is given by means of the stereopticon. Among the sets of slides used are two relating to matters of housing, sanitation, care of streets, and means of making the city attractive.

"Co-operation between the officials of the Department of Public Works and the city teachers and principals would be quite valuable. If certain persons could be available for talks to groups of parents and pupils, at the request of principals, it is certain that their services would be in demand, especially if the lectures which they gave were illustrated.

"Copies of the ordinances relating to sanitation might be of service to the teachers and principals of the schools, but for distribution to the children it would be better to print a series of leaflets, each devoted to one or two topics. These topics could be treated very simply and directly and would be most effective if illustrated.

"Permit me to express my appreciation of your courtesy in consulting me in this matter. The school authorities will be glad to co-operate with your board in every way possible. Very truly yours,

(Signed) "ELLA FLAGG YOUNG,
"Superintendent of Schools."

General committees and civic organizations should be interested to affiliate and co-operate in the work of the Street Bureau. Publicity campaigns undertaken by such organizations in the interest of spring and fall cleanup crusades and children's cleaning brigades will do much to raise the general standard of cleanliness of the city's streets, alleys, vacant lots and homes.

Consideration has been given to the matter of creating interest of the citizen body in the work being performed by different departments of the city government by providing the moving picture theaters in the city with films showing the character and scope of municipal work. These would depict the diversity and efficiency of work being performed by the different city departments. They would be of particular benefit to the Bureau of Streets in showing the conditions which exist in different sections of the city as results of the work being done by it.

GOOD ROADS ORGANIZATION.

The need for the complete understanding of the uses made of the wheel tax fund and the co-operation of the citizen body in good streets and roads, adequate and reasonable traffic control, and the safety of citizens using public highways was brought forward very pointedly during the course of this investigation.

Until very recently the majority of the persons and organizations in Cook County who have been paying the wheel tax had little or no idea of the uses made with the

funds so paid nor the objects and plans of wheel tax street repair. In the discussion of the need for definite traffic legislation and regulations, there resulted a consensus of opinion that scientific and expert traffic study was of vital importance to the interests of the city, not only from the standpoint of safety of the public, but to the commercial interests of the city, and that both the safety and facility are vital to the business interests and the prestige of the city.

The results of these discussions have led to the consideration by His Honor, the Mayor, of the appointment of an expert traffic commission, consisting of men representing the public and business interests of the city. This commission is to be made a clearing house for all traffic legislation and regulation to the end that its final recommendations be duly enforced and adhered to.

Another important result of this discussion has been the organization of an associated good roads organization of Chicago and Cook County, which consists of members representing large civic and business organizations of the city. This association has, for the past few months, been at work in an endeavor to secure the co-operation of all interested in the general subject of street and road traffic and improvement and has been permanently organized to accomplish the following objects:

1—To bring about the universal co-operation of all citizens in the matter of good roads and the safe and proper use thereof.

2—Efficiency and economy in the expenditure of all funds devoted to the construction, repair and maintenance of streets and highways.

3—Uniform, fair and rigid enforcement of all laws, ordinances, rules and regulations affecting the use of streets and highways by vehicles and pedestrians.

4—The study of traffic problems, including street lighting and traffic control.

5—Co-operation with governmental authorities in the matters above outlined and in the securing of the passage of uniform legislation tending to promote the safety and facility of traffic, and to better safeguard life and convenience of citizens.

In compliance with the above purposes of the organization, this association has adopted a plan of issuing regular bulletins on the good and clean roads movement in Chicago and Cook County. These bulletins are being distributed to spread the news of the work and plans on the construction and maintenance of the main thoroughfares of the city and county and in order to keep the citizen body informed of the expenditures of the funds which are available from the city wheel tax, the street road appropriations and the county road and bridge tax. This movement and organization is bound to result in helpful co-operation of the citizen body, greater and definite traffic regulations and legislation and generally effective and economical road developments and maintenance.

SUMMARY OF RECOMMENDATIONS.

The following is a summary of the recommendations included in this report:

Cleaning of Streets and Alleys and Removal of Street Dirt.

1—That the service given in the cleaning of streets and alleys be uniform throughout the city, the frequency of cleaning being based upon the analysis of the conditions and factors affecting street cleaning included in this report, and that the appropriations and expenditures for the cleaning of streets and alleys in 1914 be based upon the uniform standards and schedules which have been installed during the past year.

2—That uniform standards and schedules for cleaning streets and alleys be kept up to date and changes made from time to time to provide for changing conditions in different sections of the city, and that appropriations for such work be hereafter based upon these standards and schedules.

3—That the area of pavement allotted to any laborer and the number of cleanings per week be apportioned on the basis of the uniform standards and schedules, and that the employe assigned to each route be required to maintain the standard of service defined in these schedules.

4—That the block system of cleaning streets and alleys be extended and the gang system be limited throughout the city.

5—That the use of street dirt boxes, scrapers and wide brooms be extended throughout the city for the cleaning of streets and alleys.

6—That street dirt cans on light two-wheeled carts be tried out in some sections of the city, particularly where wooden dirt carts are soon to be replaced.

7—That permission be granted for the building of several depressed vaults for street dirt boxes, in sidewalks in the loop district where the cost is not prohibitive.

8—That at least three squeegees and two new pressure flushers be purchased for use in the downtown section.

9—That storage compartments be constructed at fences in alleys in the sections of the city where street dirt cans are to be used to furnish space for emptying and temporary storage of cans with dirt.

10—That the cleaning of the Randolph street market be done directly by ward forces of the 18th ward, and that the superintendent be held strictly responsible for the cleanliness of this market, as now required in the other two markets, and that an appropriation for this work be included for this ward instead of having the same done by contract.

11—That the alley fences and walls in the congested districts be white washed and provision for so doing be made for all wards in the city having such districts.

12—That in all cases where private improvement associations and teaming contractors employed by them are granted the free use of water for sprinkling streets, such work should conform to the regulations of the Bureau of Streets, and the sprinkling wagons be inspected and approved as to design by the Commissioner of Public Works in order that the quantity of water supply be regulated so as to eliminate the possibility of flooding and the consequent damage to city pavements.

13—That experiments be conducted by adding a mixture, such as calcium chloride, to water which is sprinkled on different streets with the view of eliminating the dust nuisance and adding to the effectiveness of street cleaning.

14—That arrangement be made with the street railway companies for the transportation of refuse and miscellaneous wastes over their rights of way from the several local loading stations herein proposed to the places of final disposition.

15—That the use of paper burners be extended throughout the city and that slight changes in the construction of the present type of burner be made for all paper burners ordered in the future, and that the men assigned to this work also assist collectors in the removal of refuse in alleys.

16—That the appropriation for special snow removal service in the different wards of the city be provided in the appropriation ordinance and that the service given be distributed upon the needs and requirements of the business sections as herein given.

Collection and Removal of Garbage.

17—That the appropriations for garbage collection and removal in 1914 be based upon uniform service, which takes into consideration character and congestion of population, housing conditions, quantity of garbage produced, and the death rate; that uniform service for garbage collection and removal be maintained, and changes be made with changing conditions, and that the appropriations for this service be hereafter based on such uniform service.

18—That the matter of the disposal of dead animals be considered in connection with the disposition of garbage and refuse before another contract for the disposal of dead animals is let.

19—That the city erect additional modern garbage loading stations in the southern and northwestern sections of the city to decrease the average length of haul now required.

20—That provision be made in the 1914 appropriation ordinance for two 100-ton incinerating plants to be located in the southern and northwestern parts of the city (one to be located at 95th street and Stony Island avenue).

21—That the matter of the purchase of barges by the city for the transportation of garbage from loading stations to the place of final disposition be considered with view of obtaining more effective and economical service.

22—That the present Chicago avenue loading station be replaced by a modern sanitary permanent station.

23—That provision be made for the purchase and installation of additional derricks at the unloading stations and at the place of final disposition of garbage, so that the long waits of teams be minimized and the capacity of these stations be increased.

24—That the scrap material accumulated in the yards of the repair shops and in the ward yards, which now takes up considerable valuable space, be disposed of more regularly, as the value of this material does not recompense for the use of the space.

25—That when new garbage tanks are ordered, they be increased in size by building them six or eight inches higher than those now in use.

Collection and Disposal or Ashes and Rubbish.

26—That appropriations for collection of rubbish, ashes and other miscellaneous waste for 1914 be based upon uniform service, herein provided, which takes into consideration character and congestion of population, character of buildings and the death rate, and that uniform service for the collection and removal of refuse, ashes and miscellaneous waste be maintained and changes be made with changing conditions, and that appropriations for this service be made hereafter on such uniform service.

27—That the loading station at 15th and Loomis streets be rearranged and additional equipment of cars and motors be provided, so that teams for rubbish and street dirt collection from additional wards may be able to unload there, and that the rubbish wagons be designed with lower bodies and increased in size by the provision of sideboards hinged to the rubbish box.

28—That provision be made in the 1914 appropriation ordinance for the erection of an additional loading station on Goose Island at Division and Hooker streets, and similar provision be made for a rubbish loading station in the vicinity of 46th avenue and Chicago avenue or Lake street and in the vicinity of 64th street and Prairie avenue, in order to reduce the present length of haul.

29—That consideration be given to a special design for loading stations, providing for a covered structure with sufficient equipment to unload wagons at the rate of maximum delivery, and sufficient storage for empty ant loaded cars—typical design shown in Plates XVII and XVIII.

30—That the matter of providing local incinerators in different parts of the city in connection with the loading stations be considered when future loading stations are erected.

31—That the city consider the purchase or lease of additional sites for dumping of rubbish and miscellaneous wastes, as shown herein.

Repair of Streets and Alleys.

32—That the appropriations for the repair of pavements out of reserve be based upon definite standards and schedules, herein provided, which take into consideration the condition of pavements and other factors controlling the repair of pavements, and that the distribution of appropriations be made and street repair work be hereafter carried on in accordance with these standards and bases.

33—That wheel tax repair of streets be directed first to the more permanent pavements and any remaining moneys of the wheel tax fund and those specifically appropriated for by the City Council be used for the repair of other pavements, and that where the cost of repair and maintenance is equal to or greater than the interest cost on new work new pavements be laid rather than have the old pavements repaired.

34—That there be included in the appropriation ordinance sufficient funds to purchase at least two five-ton motor trucks to be used for the transportation of crushed stone and other materials for the street repair work by the Bureau.

Emergency Needs.

35—That provision be made in the appropriation ordinance for emergency needs in accordance with the estimates herein provided, and that expenditures be made on the standards and bases included herein.

Administrative Problems, Equipment, Systems, Etc.

36—That all regular street cleaners, garbage and rubbish drivers and helpers and section foremen be required to wear uniforms, the color and design of which is indicated herein, and the purchase of these uniforms be arranged by the city and distributed to the employes at cost, the uniforms to be washed and maintained by the employes.

37—That all section foremen, field inspectors, regular street cleaners and garbage and rubbish drivers be furnished with badges having inscriptions of the names of the department and bureau by whom they are employed, and a number, which are to be returned by the employes when their services with the city are discontinued.

38—That there be included in the 1914 appropriation ordinance the items of necessary additional supplies and modern equipment for the different activities of the Bureau of Streets included in this report.

39—That inspection be made an important factor in street cleaning and waste collection and removal and form a general check on the standards of service, the service maintained and conditions prevailing throughout the city.

40—That traffic census and time studies of work be continued in order to determine changes in conditions, proper standards and methods for the cleaning and repair of streets and alleys, collection of garbage and refuse, and the effectiveness of equipment.

41—That a complete closed record system be installed and used in each ward office and in the central office, so that all records and reports coming from the ward offices to the central office will be subject to comparison and analysis in accordance with the definite units and uniform standards herein established.

42—That there be a more complete distribution of accounts in the expenditure of money in different wards for street and alley cleaning, refuse collection and removal and street repairs, and that these accounts be maintained in a manner as to furnish the central office with definite information as to the amount and cost of each unit of work, each organization unit, and the cost of tools and supplies.

43—That daily service reports be required of each section foreman, to be checked with reports in the central office and be used as a basis for ascertaining and recording the effectiveness of service and individual and group efficiency.

44—That junior ward clerks be assigned to the central and ward offices to keep the records and handle general clerical work where at present section foremen, street repair foremen or laborers are assigned to this work. The displaced employes should be returned to labor work.

45—That efficiency markings based upon attendance, discipline and quantity and quality of work be kept in the ward offices, and the monthly efficiency markings be recorded in the central office of the Bureau of Streets, and in the office of the Civil Service Commission, and that retention, advancement and discharge be based on these efficiency records and seniority.

46—That general committees and organizations interested in civic matters be encouraged to affiliate and co-operate in educational and publicity campaigns in the interest of spring and fall clean-ups, and in children's cleaning brigades, in order to raise the general standard of cleanliness in the streets, alleys and vacant lots.

47—That consideration be given to the matter of creating interest of the citizen body in the work being performed by providing the moving picture theaters with films showing the character and scope of municipal work.

48—That the city proceed to purchase available sites for at least ten additional modern central loading stations in the different sections of the city, these sites to be located in such places as to provide for most economical haul and disposal.

49—That provision be made in the 1914 appropriation ordinance for the purchase of a sufficient number of motor tractors for hauling refuse and garbage from stations to local disposal plants.

Respectfully submitted,

(Signed) L. E. McGANN,
Commissioner of Public Works.

(Signed) H. M. CAMPBELL,
JOHN J. FLYNN,
ELTON LOWER,
Members, Civil Service Commission,
City of Chicago.

Approved:

EFFICIENCY DIVISION,
CIVIL SERVICE COMMISSION.

(Signed) JAMES MILES,
Examiner in Charge, Efficiency Division.

(Signed) J. L. JACOBS,
Efficiency Engineer in Charge.

APPENDIX "A"

SUPPLEMENTARY REPORT ON BUREAU OF STREETS

Letter of Transmittal

October 20, 1913.

HON. LAWRENCE E. McGANN,
COMMISSIONER OF PUBLIC WORKS,
CITY OF CHICAGO.

Dear Sir: The Commission begs to transmit herewith separate report of the Efficiency Division treating of such matters of administration and organization in the Bureau of Streets, including their relationship to other bureaus of the Department of Public Works and other departments of the city government not included in the joint report of yourself and this Commission, to be sent to the City Council in accordance with the order of April 21, 1913.

Yours very truly,

CIVIL SERVICE COMMISSION,
City of Chicago.

(Signed) JOHN J. FLYNN,
ELTON LOWER,
Commissioners.

INVESTIGATION OF ADMINISTRATIVE PROBLEMS AND ORGANIZATION BUREAU OF STREETS.

October 15, 1913.

CIVIL SERVICE COMMISSION,
CITY OF CHICAGO.

Gentlemen: In accordance with the request of the Commissioner of Public Works and your order, the investigation of methods of collecting garbage, ashes and miscellaneous waste, which has been conducted in conjunction with the Department of Public Works, was also made to include a study of the other activities, administrative questions, organization and methods used in carrying on the various activities of the Bureau of Streets, including their relationship to the other bureaus of the Department of Public Works and other departments of the city government.

The report on a plan for the cleaning and repair of streets and alleys, the collection of garbage, ashes and miscellaneous waste, together with the recommendations in the premises, is now completed, and is to be submitted to the City Council in accordance with its order of April 21, 1913.

The following is a report on such matters not included in the order of the City Council of April 21, 1913, and covers the findings and recommendations which cannot be put into effect without certain changes and additions to the present city ordinances, changes in the organization of the different bureaus of the Department of Public Works which require action of the City Council, and recommendations for further co-operation between the city departments which have not been included in the above report.

The study of the work of the permit division of the Bureau of Streets, on public utility inspection and on the contract and accounting system of the Bureau of Streets, has not yet been finished, but the same will be completed and report submitted to the Commissioner of Public Works.

REQUEST FOR INVESTIGATION.

On May 3, 1913, the Commissioner of Public Works directed the following communication to your honorable Commission:

The Honorable, The Civil Service Commission.

Gentlemen: In pursuance of the conference of recent date regarding the order of the City Council directing the Commissioner of Public Works, in conjunction with the Efficiency Division of the Civil Service Commission, to make a thorough investigation and report to the Council of a comprehensive and scientific method for the collection of garbage, ashes and miscellaneous waste, I request the co-operation of the Commission in this regard and the assignment to the work of such members of the Efficiency Division as are available.

At this time, in view of the fact that the Efficiency Division has been at work in the Bureau of Streets since last July, and is now at work therein, I would suggest that the work comprehend all of the activities of the Bureau of Streets, including their relationship to the activities of the other bureaus of the department and other departments of the city government.

This latter suggestion is made in order that the Council request may be better complied with and the Bureau of Streets receive the benefit of a complete study of its needs.

It is also important at this time to take up the expenditure of ward appropriations adopted by the City Council, based upon the report of your Commission, and to give consideration to the Efficiency Division's recommendation regarding the distribution of the wheel tax fund.

To assure immediate benefits to the city as a result of these investigations, I desire that where individual inefficiency is shown, specifications be prepared for the signature of the head of the bureau and the signature of the commissioner, to be transmitted so that the inefficient and neglectful employes may be separated from the service. Where changes of method are desired and recommended by your investigators that may be put into operation within the appropriation limitation, the investigator making such recommendation will immediately formulate the proper order for approval, and on its being executed see that it is put into operation to secure the effect desired by the change.

I particularly desire that the last two suggestions be put into effect so that we may secure the immediate benefit of the investigation or determine the impracticability of the recommendation, due either to financial limitation or to a mistake in judgment.

Yours very truly,

(Signed) L. E. McGANN,
Commissioner of Public Works.

In answer thereto the following letter was transmitted on May 7, 1913:

Hon. Lawrence E. McGann,
Commissioner of Public Works, City of Chicago.

Dear Sir: The Commission is in receipt of your letter of the 3rd instant, in which you request that the Efficiency Division of this Commission conduct, in conjunction with the Commissioner of Public Works, a thorough investigation, and report to the City Council on a comprehensive and scientific plan for the collection of pure garbage, ashes, refuse and miscellaneous waste, and of other activities of the Bureau of Streets, including their relationship to the other bureaus of the Department of Public Works and other departments of the city government. In reply thereto the Commission has directed its Efficiency Division to take up the above work.

In this study, as in other work undertaken by the division, it will be the purpose to ascertain defects or faults in present methods, systems and conditions, and in so far as it is possible have the same remedied and corrected as the work proceeds. The work will be broadly conducted along the following general heads:

1. Ascertaining the methods and systems in use under existing conditions; verifying and examining records of work, men and equipment.
2. Suggesting changes in methods, systems and organization where deemed advisable.
3. Work in co-operation with departmental officials in installing effective methods, systems and organization.

The Commission will from time to time report any constructive remedies which it may believe will result in increasing the efficiency of men,

methods, equipment and work, as may be put into effect under existing conditions as to organization, equipment and city ordinances. It will also report on the existing efficiency of officers, employes, methods, and equipment. Findings and conclusions will also be submitted which might be adopted if changes were made in the city ordinances and additional needed equipment secured.

The scope of the inquiry will be as broad as possible and cover all the details connected with each activity of the Bureau of Streets. This work will be under the supervision of the present Efficiency Division staff, and all the details covered as the Commission is able to place men qualified to render efficient and constructive work.

Yours very truly
CIVIL SERVICE COMMISSION.
(Signed) ELTON LOWER,
Commissioner.

ACTIVITIES OF DEPARTMENT.

Section 2063 and 2069 of the municipal code define the bureaus which are embraced in the Departmnet of Public Works and the duties of the Commissioner of Public Works as follows:

"2063. Department of Public Works established.) There is hereby established an executive department of the municipal government of the city, which shall be known as the Department of Public Works and shall embrace the Commissioner of Public Works, the Deputy Commissioner, the City Engineer, the Superintendent of Streets, the First Assistant Superintendent of Streets, the Second Assistant Superintendent of Streets, the Third Assistant Superintendent of Streets, the Superintendent of Water, the Superintendent of Sewers, the Superintendent of Maps, the Superintendent of the Bureau of Compensations, and such other assistants and employes as the City Council may by ordinance provide."

"2069. Duties). It shall be the duty of the said Commissioner of Public Works, subject to the provisions hereof and the ordinances of the city, to take special charge and superintendence of all streets, alleys and highways in the city, and of all walks and crosswalks, bridges, viaducts, docks, wharves, public places, public landings and public grounds in the city; of all markets and market places, and all other public buildings in the city belonging to the city, and of the erection of all public buildings; of all works for the widening, deepening or dredging of the Chicago River and of its branches, and of the harbor of the said city; of all sewers and works pertaining thereto; and of the waterworks of said city, and the collection of all water rates and fees for the use of water, or for permits issued in connection with the waterworks system, and of all sewerage permits and licenses; and he shall award and execute all contracts for any work or public improvement, the cost of which shall exceed the sum of five hundred dollars, and all contracts for coal for the use of any departments of the city; provided, however, that nothing herein contained shall be construed as relating to the construction of local improvements, paid for in whole or in part by special assessment; provided, however, that said commissioner shall have charge of all local improvements paid for in whole or in part by special assessment upon their completion and acceptance by the Board of Local Improvements, or upon their completion, acceptance and approval by the court confirming the assessment, and said commissioner shall have power to enforce all provisions of any contract for such improvements which relate to the guarantee and maintenance of such improvements and the repairs thereto."

The detail study of the activities and organization of the present Departmentof Public Works shows that the Commissioner of Public Works is taxed greatly with extensive duties and responsibilities, and is hampered with too much detail. The ramifications of the functions are so extensive and various that it is not to be expected that he give more than casual attention to the work of the nine separate bureaus. It therefore devolves upon the head of each bureau to care for these activities. The numerous duties connected with the caring for these activities and the organization preclude any intimate knowledge of the work or division of responsibility, and do not give the Commissioner of Public Works sufficient opportunity to study the larger administrative problems and have a broad executive control of the department.

PLATE XXI
PRESENT ORGANIZATION

DEPARTMENT of PUBLIC WORKS

4639 – $4,595,373
334,393 §

COMMISSIONER of PUBLIC WORKS
Ex 1-10,000

4638 | $4,585,373
334,393 §

DEPUTY COMMISSIONER of PUBLIC WORKS
Ex 1-5000

4637 | $4,580,373
334,393 §

BUREAU of WATER

SUPT. of WATER
210 — 256,784
5,500 §

BUREAU of SEWERS

SUPT. of SEWERS
321 — 371,247
6,000 §

BUREAU of STREETS

SUPT. of STREETS
2013 — 1,487,127
267,125 §

BUR. of ENGINEER'G

CITY ENGINEER
1869 — 2,237,733
44,178 §

COMM'S'R'S OFFICE

12 | $19,850
1,090 §

CHIEF CLERK
C-VII — 1-3600

11 | $16,250

PRINCIPAL CONTRACT CLERK
C-V — 1-2000

1 | $960

JUNIOR CLERK
C-III — 1-960

HEAD ACCOUNTANT
C-VI — 1-2250

5 | $6,960

SENIOR BOOKKEEPER
C-IV — 1-1500

SENIOR CLERK
C-IV — 1-1500

SENIOR CLERK
C-IV — 3-1320

PRINCIPAL STENOGRAPHER
C-V — 1-1800

SENIOR STENOGRAPHER
C-IV — 1-1320

JUNIOR CLERK
C-III — 1-960

BUR. of COMPENSATION

SUPT. of COMPENSATION
4 — 7,260

BUREAU of CITY HALL

CITY ARCHITECT
164 — 142,112
10,500 §

BUREAU of MAPS & PLATS

SUPT. of MAPS
27 — 38,380

BUREAU of ARCHITECTURE

CITY ARCHITECT
12 — 19,880

Entries on this chart are based on the appropriation ordinance for the year 1913, passed by the City Council Jan. 2, 1913, and amended Jan. 8, 1913.

Number of positions and salary total appropriated for positions are indicated by lines to the left and right of the line of authority.

§Blanket salary appropriation for emergency uses follows the amount specifically appropriated.

The consolidation of bureaus within the Department of Public Works into functional bureaus would more definitely centralize responsibility for effective and economical service upon one official directly responsible to the Commissioner of Public Works. It will also relieve the Commissioner of Public Works of numerous details now devolving upon him in having different bureau heads report to him, and permit him to more closely care for all the city public works, public buildings and improvements, the importance and extent of which require his undivided attention.

A study of the activities and duties of the bureaus of the Department of Public Works has been made and suggested consolidations and changes in the bureaus' organization and the reorganization of the Department of Public Works are shown in the charts, Plate XXII.

The present organization in the Department of Public Works and the lines of responsibility for work now covered by the department are shown in chart attached hereto as Plate XXI. It will be noted from this chart that there are nine separate bureaus within the department for which the following appropriations were made for 1912 and for the current year. Appropriations made for the year 1912 and for the current year for other larger city departments (exclusive of special bond issues) further show the relative importance and responsibilities of the city departments which are presided over by cabinet officials and the different bureaus within the Department of Public Works:

	Appropriations 1912	Per Cent of Total 1912	Appropriations 1913	Per Cent of Total 1913
Bureau of Engineering	$ 7,861,765.06	59.0	$ 7,325,127.63	57.7
Bureau of Streets	4,255,068.00	31.9	4,119,209.85	32.5
Bureau of Sewers	527,965.38	3.9	531,181.67	4.2
Bureau of Water	362,063.70	2.6	336,979.00	2.6
Bureau of City Hall	246,833.72	1.8	241,845.00	1.9
Commissioner's Office	46,197.00	0.3	51,170.00	0.4
Bureau of Maps and Plats	44,846.50	0.3	63,266.00	0.5
Bureau of Compensation	7,685.00	0.1	7,660.00	0.1
Bureau of Architecture	7,365.00	0.1	6,825.00	0.1
Department of Public Works (exclusive of bond issue)	13,359,789.36	100.0	12,683,264.15	100.0

Of the above appropriations for the Department of Public Works approximately $10,000,000 was expended during the year 1912, exclusive of the bond issue expenditures.

Board of Education	16,631,310.00	18,941,250.00
Department of Police	6,714,047.80	6,721,193.64
Department of Fire	3,632,770.11	3,359,313.50
Department of Electricity	1,481,531.29	1,730,253.47
Board of Local Improvements	872,355.38	911,986.74
Department of Health	720,908.00	727,851.20

It will be seen from the above that of the total appropriation of approximately $13,000,000 appropriated each year for the Department of Public Works, about $4,200,000 or slightly less than one-third was provided for the Bureau of Streets. On the basis of the current and each of the past eight years' appropriations, the Street Bureau stands fourth in the list of departments, being ranked only by the Department of Public Works (of which it is a third part), the Board of Education and the Department of Police.

Analysis of the appropriations and expenditures shown in Table I indicates the growth of the Street Bureau during the past seven years. In 1907 the total expenditures of the Bureau of Streets was $1,697,402 and for the year 1913 the total expenditure will be approximately $4,200,000, an increase of about 300% in seven years.

The increased expenditure has carried with it a greater increase in the activities and services rendered. The bureau activities have become so extensive and necessary that an organization of staff and line men must be provided to care for the same in a business-like and effective manner.

While the activites in the Street Bureau have been increased by over 300%, activities closely related to those in the Street Bureau are carried on by other bureaus within the Department of Public Works and these organizations carry on their work with little relation or co-ordination with the Street Bureau. The organizations referred to are those of the Bureau of Sewers and Bureau of Compensation of the Department of Public Works. The combined activities of the Bureau of Streets and Bureau of Sewers have become of such moment and affect the cleanliness and sanitation of the city and the health of every citizen of the community that they now require constant co-operation of the administrative forces.

There is a division of responsibility between the Bureau of Streets and the Bureau of Compensation in that the ordinances provide that the Superintendent of Streets "have charge, under the supervision and direction of the Commissioner of Public Works, of all streets, sidewalks and public ways of the city and of the improvements and repair thereof, except where such repair or improvement of streets and sidewalks is to be paid for wholly or in part by special assessment"; while the Superintendent of Compensation is also required to "have charge of and receive all applications for permits to use streets and alleys or public grounds or any space beneath the same." It appears that the logical authority for the issuing of any permits for the use of streets, alleys or public grounds falls under the Superintendent of Streets, who is under the direction of the Commissioner of Public Works.

In order that the responsibility for the important activities now covered by these bureaus be more centralized and the administaration of these activities be under the direct responsibility and scrutiny of one official, these bureaus should be consolidated into the Bureau of Streets. The advantage of an organization by functions, including as many as possible of the bureaus, would be that the present organization would be simpler and that it would represent a co-ordination of all bureaus of the department having functions in the care and maintenance of the city sewers, streets and sidewalks. A similar plan of having one functional street bureau is now followed in the larger eastern cities, particularly those of New York and Boston.

PROPOSED REORGANIZATION OF BUREAUS.

The charts attached hereto as Plates XXIII and XXIV show the general plan of organization and lines of authority and responsibility as fixed at present in the Bureau of Streets, the Bureau of Sewers and the Bureau of Compensation. This diagramatic representation indicates the scope of the activities and divisions thereof among the different officers and employes now employed in these bureaus. It does not, however, show conditions which actually exist in the assignment of the work and duplication with other departments of the city.

The consolidation of the Bureau of Sewers and the Bureau of Compensation with the Bureau of Streets will necessitate some changes in the number and disposition of work of the organization as at present constituted, so that the work of similar character, which is now done under separate heads, will be combined and the responsibility centralized. As will be seen from the charts of the present organization of these bureaus, the more important activities and functions fall under four natural divisions as follows:

1—Division of Operations (street and sewer cleaning and collection of refuse).
2—Division of Repairs (street and sewer repairs).
3—Division of Permits (public utility inspection, compensation and sidewalk permits).
4—Division of Records.

The question of the consolidation of the more important activities of these bureaus within the Bureau of Streets, is, therefore, solved by placing the main activities of each under the four above mentioned proposed divisions, the important subdivisions of which are shown in the organization charts of the consolidated bureaus in Plate XXII. The details under each of the divisions are considered under separate headings in what follows.

DEPARTMENT of PUBLIC WORKS
BUREAU of SEWERS

PLATE XXIII
PRESENT ORGANIZATION

Entries on this chart are based on the appropriation ordinance for the year 1913, passed by the City Council Jan. 2, 1913, and amended Jan. 8, 1913.

Number and positions and salary total appropriated for positions are indicated by lines to the left and right of the line of authority.

*Provided for in blanket item, number of men-year estimated.

§Blanket salary appropriation for emergency uses follows the amount specifically appropriated.

321 – $369,673.33
7,573.34 §

SUPT. of SEWERS 1-V 1-4000

320 | $365,673.33 7,573.34 §

ASST. SUPT. of SEWERS 1-IV 1-2400

319 | $363,273.33 7,573.34 §

DIVISION of PUMPING STATIONS

38 | $48,308.33 2,573.34 §

- 1ST. ASST. OPERATING ENGINEER IN CHARGE E-a-V 2-2000
- 2ND. ASST. OPERATING ENGINEER IN CHARGE E-a-IV 3-1560

33 | $39,628.33 1,000 §

- 2ND. ASST. OPER'T'G ENG'R E-a-IV 6-1560
- 3RD. ASST. OPER'T'G ENG'R E-a-III 6-1460
- 3RD. ASST. OPER'T'G ENG'R E-a-III 1-121.66/mo.

20* | $21,265 1,000 §

- OILER E-a-I 6-1080
- STATIONARY FIREMAN K-I 12-1080
- MECHANIC K-II Union Scale §
- LABOR L-a §

DIVISION of HOUSE DRAIN INSPECTION

29 | $36,480

- PRINCIPAL CLERK C-V 1-1800
- SENIOR CLERK C-IV 2-1500
- DRAFTSMAN B-1 1-1320
- DRAFTSMAN B-I 1-1200
- JUNIOR CLERK C-III 2-1200
- JUNIOR STENOGRAPHER C-III 1-1080
- MESSENGER C-II 1-720

HOUSE DRAIN INSP'R IN CHARGE H-IV 1-1800

- JUNCTION SETTER K-II 2-1800
- SEWER PIPE INSPECTOR H-II 1-1080
- HOUSE DRAIN INSPECTOR

SUPERINTENDENT'S OFFICE

9 | $11,520

DIVISION of BENCHES & GRADES

4 | $6,460

ASST. ENGINEER (BENCHES) B-III 1-2500

3 | $3,960

- JUNIOR ENGINEER B-II 1-1800
- RODMAN B-I 2-1080

DIVISION of SEWER CLEANING

193 | $196,880

- FOREMAN SEWER CLEANING K-III 1-1800
- FOREMAN SEWER CLEANING K-III 6-1680

186 | $185,000

ASST. FOREMAN SEWER CLEANG K-II 9-4.30/day

177 | $172,000

- LABORER L-a 39-3.30/day*
- LABORER L-a 138-3.00/day*

DIVISION of SEWER REPAIRS

46 | $63,625 5,000 §

FOREMAN SEWER PIPE YARDS K-III 1-2160

13 | $15,460.50

- FOREMAN CARPENTER K-III 1-1800

12 | $13,660.50

- MECHANIC K-II 4 – Union Scale*
- SEWER LABORER L-b 6-3.00/day*
- WATCHMAN K-I 2-720

ASSISTANT ENGINEER B-III 1-2160

4 | $6,480

- MASON INSPECTOR H-II 3-1800
- RODMAN B-I 1-1080

FOREMAN BRICKLAYER K-III 1-2200

26 | $35,164.50 5,000 §

- FOREMAN SEWER REPAIRS K-III 1-1800

25 | $33,364.50 5,000 §

- BRICKLAYER K-II 7-160/mo*
- MECHANIC K-II 4 Union Scale
- JUNIOR CLERK C-III 1-1080
- INSPECTOR (as required) H-II 5,000 §
- SEWER LABORER L-b 13-3.00/day*

4 $7,260

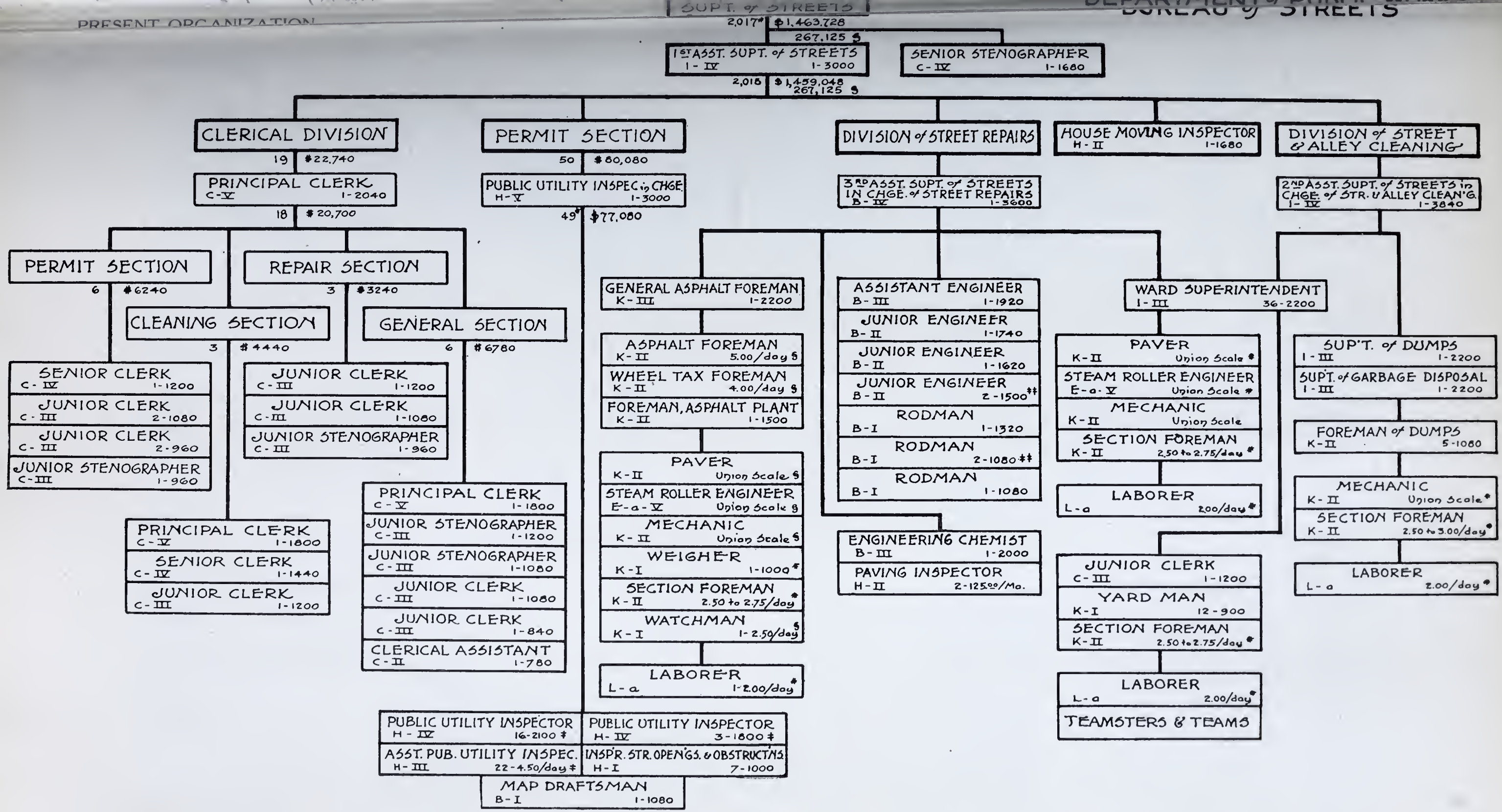
SUPT. of COMPENSATION C-VII 1-3600

3 | $3,660

- INVESTIGATOR C-IV 1-1500
- JUNIOR STENOGRAPHER

PRESENT ORGANIZATION

DEPARTMENT of PUBLIC WORKS
BUREAU of STREETS



Entries on this chart are based on the appropriation ordinance for the year 1913, passed by the City Council Jan. 2, 1913, and amended Jan. 8, 1913.

Number of positions and salary total appropriated for positions are indicated by lines to the left and right of the line of authority.

*Provided for in blanket item, number of men-year estimated.

§Blanket salary appropriation for emergency uses follows the amount specifically appropriated.

‡To be reimbursed by corporations for which work is done.

‡‡To be reimbursed by traction companies.

Besides the main activities above mentioned which are now being cared for by the Bureau of Sewers, there are minor activities which grew up in the bureau and have remained there without reference to the existence of other departments which are performing similar work. With the proposed consolidation of the Bureau of Sewers and the Bureau of Streets these minor organizations should be transferred to those departments so that responsibility for this work will become more centralized.

It is recommended that the division of sewer pumping stations be placed under the operating section of the division of water pumping stations in the Bureau of Engineering. The work of these two divisions is exactly of a similar character, except that the plants of one pump sewage, while the other pump water.

It is also recommended that the inspection of house drains and the licensing of drain layers be transferred to the Department of Health where this work can be handled in conjunction with the licensing of plumbers and plumbing.

The division of benches and grades was originally placed in the Bureau of Sewers at a time when this bureau was called upon more than any other to determine and furnish the grades of sewers through the Commissioner of Public Works for all contemplated new and repair work. The survey division in the Bureau of Maps and Plats is engaged in the survey of all streets and alleys in the city and the work of determining grades and locating permanent bench marks naturally falls under this work. It is, therefore, recommended that the division of benches and grades be transferred to the Bureau of Maps and Plats where this work will be handled in conjunction with the survey work.

While it is not possible to definitely estimate the monetary saving that will be effected by the consolidation of the Bureaus of Sewers and Compensation with the Bureau of Streets and the transfer of the above mentioned division to the other departments above recommended, the reorganization and consolidation will naturally increase the efficiency and centralize the responsibility of the work in all the branches. Reduction in the number of employes and a consequent saving in salaries will necessarily follow.

DIVISION OF OPERATIONS.

As at present organized the division of operations is under the direction of the second assistant Superintendent of Streets, who has charge of the cleaning of streets and alleys and collection and removal of garbage and refuse. The proposed transfer of the Sewer Bureau into the Street Bureau will place the responsibility of the cleaning of sewers and catch basins under this division. The responsibility for the work in each ward should be fixed definitely upon the superintendents of the respective wards of the city and the second assistant Superintendent of Streets be held responsible for the work and efficiency of all ward superintendents.

In the course of the investigation and in the installation of schedules and alley cleaning and waste collection, the need of a more complete supervision and check on the conditions and methods used in the different sections of the city was clearly shown. While the second assistant Superintendent of Streets has general charge of the work in all the wards of the city, his time is so taken up that this check is at best superficial. The service rendered and methods used were found to vary in each ward of the city, depending entirely upon the appropriations provided for each ward and the ability and efficiency of each ward superintendent.

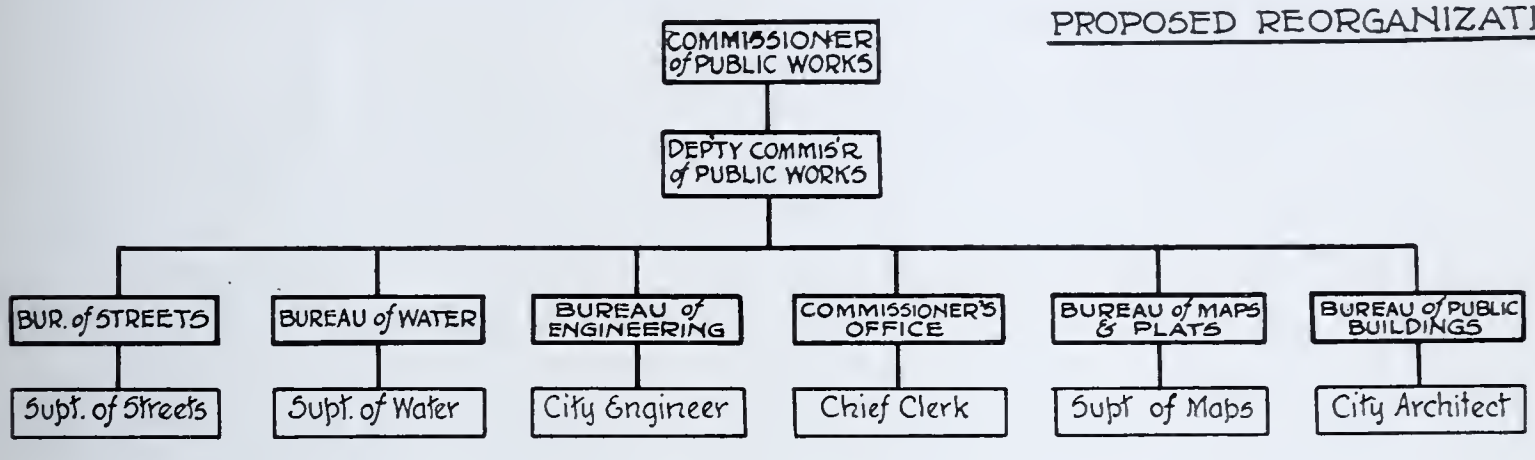
In order to maintain uniform service and methods in the whole city, it is necessary that there be a constant and sufficient check and uniform plan provided from the central office and that records and units used in the different sections of the city be definite and uniform. The matter of the installation of uniform reports and record systems is covered in the report of the Commissioner of Public Works and the Efficiency Division, which has been submitted to the City Council.

The matter of providing an organization which is to plan the work for the entire city and assist the central office in checking the methods and efficiency of service is considered under the heading "Engineering and Planning Division," which follows.

PLATE XXII

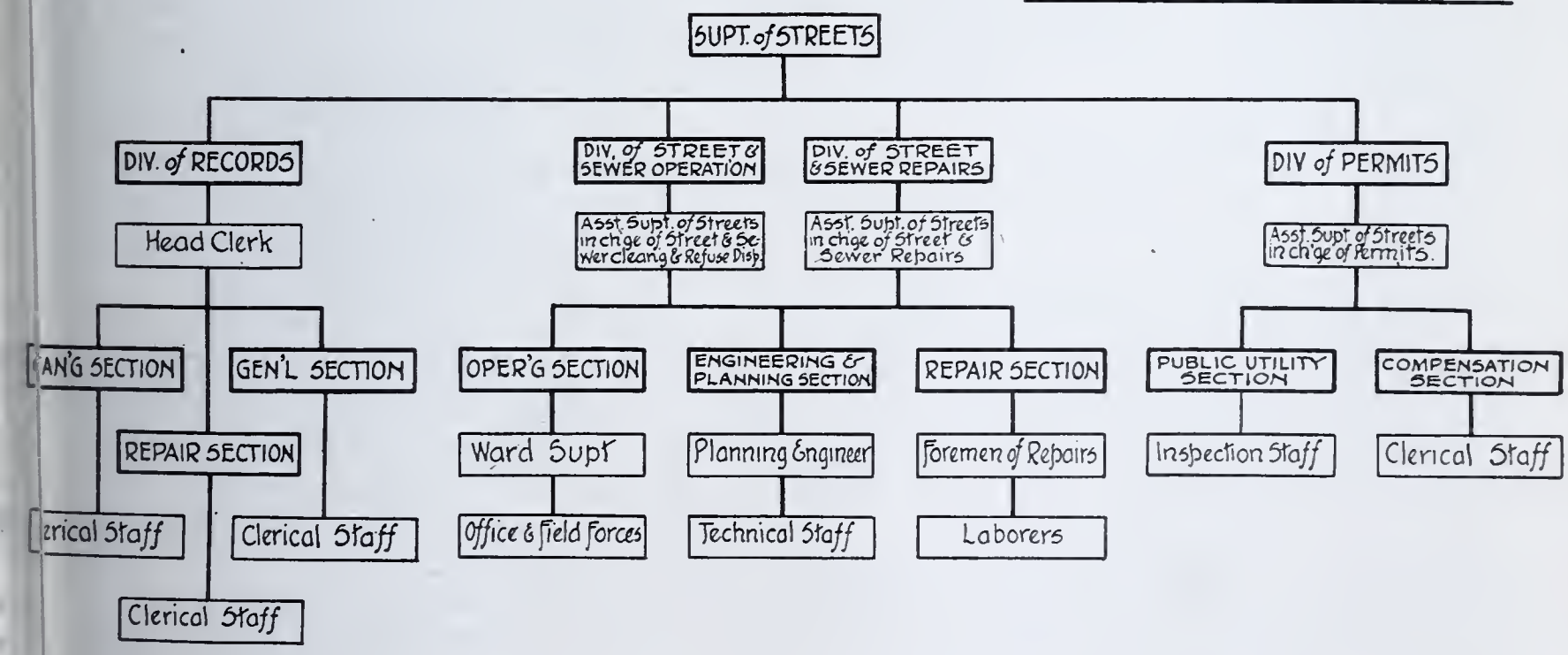
DEPARTMENT of PUBLIC WORKS

PROPOSED REORGANIZATION



BUREAU of STREETS
DEPARTMENT of PUBLIC WORKS

PROPOSED REORGANIZATION



Efficiency Division
Service Commission

While the records found in different ward offices indicated the general conditions and service rendered in each ward, they have not been kept in such shape as to allow of analysis for comparison of the relative effectiveness and unit costs of such service. Perhaps the greatest difficulty in keeping a uniform and definite system of records in ward offices is due to the fact that insufficient provision has been made in the ward offices for competent clerical assistance. At the present time laborers are used in the central and ward offices to take care of such records. In the majority of cases, these laborers have no knowledge or experience in keeping records, or the significance of unit costs or the segregation of accounts.

In order that the ward superintendents may have more time in supervising and studying conditions and work in the field, provision should be made for competent clerical assistants in the ward offices, who shall take care of all records of the respective wards. It is, therefore, recommended that the laborers who are now assigned to take care of the records in the central office and ward offices and who receive amounts varying from $2.25 to $2.75 per day be assigned to perform work as laborers and that junior ward clerks at the rate of $840 per year be assigned to take their places. Special examinations should be held and eligible lists maintained for such junior ward clerks and these clerks be required to take care of all records in the ward offices and perform such other work as may be required from time to time by the ward superintendent. The provision of these clerks will not mean any increased cost to the city, and will at the same time furnish the ward superintendent and the central office with complete and uniform records, which will be used as a basis of determining the effectiveness of service and the efficiency of all employes.

ENGINEERING AND PLANNING SECTION.

The effectiveness and uniformity of service in cleaning and repairing of streets and in the collection and removal of garbage and refuse can best be determined by the formulation of definite standards of work and proper planning and inspection of the work.

The installation of uniform schedules throughout the city and the preparation of estimates of appropriations based upon the needs and requirements of each section of the city will take care of the former for a time.

In order that service and work be maintained uniformly throughout the city and the appropriations be expended in accordance with definite and uniform methods, it will be necessary to continually check changing conditions and the work being performed in every section of the city. The growth and the importance of the activities of the Street Bureau within the last ten years have been such as require constant planning and technical analysis of conditions existing throughout the city. While it is possible for the assistant Superintendent of Streets to superficially cover the entire city, his time could be used to greater advantage to the city and the Street Bureau in passing on the larger administrative questions that arise from time to time.

Therefore, provision should be made for a staff of technical assistants working under the direction of the Superintendent and Assistant Superintendent of Streets from the central office, who shall study conditions, methods and work in the different sections of the city and assist their superiors and the ward superintendents in maintaining uniform service and methods throughout the city. They will be able to furnish the central office with information on the effectivness and economy of the service rendered, act as inspectors on complaints received at the central office and perform such other technical and engineering duties as may be required in carrying on the work of cleaning and repairing streets, alleys and sewers and the collection and removal of garbage and other wastes.

The present engineering organization provided for the division of street repairs in the Bureau of Streets should be required to take care of all the engineering, planning and inspection work above mentioned. The consolidation of the Bureau of Sewers and the Bureau of Streets will furnish this planning and engineering section with additional technical help, all of which should be placed under the charge of one engineer. This section, in carrying on the work of planning, making traffic and time studies, inspect-

ing and reporting on complaints may also assist the ward superintendents in maintaining uniform systems and in the instruction of employes in advanced methods of doing work. It is further recommended that provision be made for one planning engineer who shall be in direct charge of this section and be held responsible for the efficiency of the work by his staff.

DIVISION OF REPAIRS.

Prior to the passage of the vehicle tax ordinance, the repair of streets was cared for by the ward superintendents and the moneys were appropriated from the general fund. At the present time the city collects approximately $650,000 each year through a tax levied on all vehicles and the same is applied for the repair of streets and alleys which are out of reserve and for the construction of country roads.

The present city ordinance requires that 85% of the wheel tax shall be applied in the wards in which the owners of the vehicles reside, and the remaining 15% of the wheel tax shall be used by the Commissioner of Public Works in paying overhead charges and such other special work as may be required. The former limitation is inequitable and does not allow repair work to be done in accordance with the actual needs and requirements of the different pavements in the city.

A study has been made of the quantity and condition of the improved pavements in the different parts of the city which are now out of reserve, and maintenance standards based upon the factors which control repair of pavements have been included in the report submitted by the Commissioner of Public Works and the Efficiency Division to the City Council. The estimate of the maintenance appropriations and the distribution of the wheel tax fund, based upon these standards, have also been included in that report.

The practice of having the ward superintendents make extensive pavement repairs in and outside of their wards has been found generally uneconomical and ineffective. While these superintendents should be held responsible for the repair work being done in their respective wards, provision should be made for supervision from the central office of all extensive repair work throughout the city. This will make it possible for the bureau to distribute and have the work done uniformly under the general supervision of men who have special training and experience in the repair of different kinds of pavement. The staff under the engineering and planning section should be utilized to plan the work, and the general foreman of granite and brick repairs and general foreman of asphalt repairs should be directly in charge of all floating gangs making extensive repairs throughout the city. These general foremen should be assigned on this work throughout the year ,and during the winter when repair work reaches a minimum they should be required to assist the technical staff in inspecting and planning the work for the coming year.

DIVISION OF PERMITS.

The consolidation of the present Bureau of Compensation with the Bureau of Streets will place the former under the division of permits with the present organization of the public utility, permit and inspection division. This provision will centralize responsibility for the permit work of the Department of Public Works and will give the present public utility inspector in charge more time to check up the field work of the inspection staff.

The work of the public utility division is well defined and the lines of authority are now well fixed. The Efficiency Division has not yet completed the study and analysis of the field work being done by this staff. A report upon same will be submitted to the Commissioner of Public Works when completed.

In the proposed reorganization of the Bureau of Streets it is contemplated that the house moving inspector, who now reports to the Superintendent of Streets, will be assigned to the permit division and will report to the public utility inspector in charge, the house moving inspector's duties being of such character as to be properly classified under this division.

DIVISION OF RECORDS.

The present practice of keeping all the records and reports of all the activities of the bureau centralized in the record division has been found effective. With the installation of a uniform record system in all ward offices, the records in the central office will indicate more clearly the relative effectiveness and economy of work performed in different sections of the city.

With the consolidation of the Bureau of Sewers with the Bureau of Streets, the clerical staff of the former should be consolidated with the latter and records of all the activities kept in the same office, with resultant saving in salaries.

CO-OPERATION AND CO-ORDINATION BETWEEN DEPARTMENTS.

Instances of overlapping and duplication of work between departments have been cited in previous reports of the Civil Service Commission. Until such time as responsibility and administration of municipal activities are centralized and definitely fixed in functional organizations, the only hope for more effective and economical administration is through the consolidation of bureaus having similar work within departments and by the co-ordination and co-operation between departments having like functions and activities. The matter of consolidation of bureaus within the Department of Public Works has been considered under the heading "Activities of Department."

Study of the activities of the Bureau of Streets, Bureau of Sewers, Water Pipe Extension Division of the Bureau of Engineering, inspection work in the Board of Local Improvements, Bureau of Sanitation in the Department of Health and the Building Department, and the routine duties of patrolmen in the Department of Police indicates considerable overlapping and lack of co-ordination in important activities. Although having similar functions and covering the same grounds, each organization carries on its work separately with little or no relation to the activities and requirements of the others.

Through the combination of the yards, shops, supply stations and offices of the Bureau of Streets, Bureau of Sewers and Water Pipe Extension Division, it is estimated that it would be possible for the city to save at least $50,000 annually. This estimate has been made on the saving that would result by the abolition of a number of administrative and clerical positions, watchman's positions, telephone, rentals, heat, light, repairs, etc., which are now paid separately by each bureau in its separate yards, offices, etc. Even larger amounts could be saved and the efficiency of the service in the activities of these bureaus increased by greater co-ordination between the construction and repair organizations and by co-operation in buying material and supplies.

The attention of the Efficiency Division has been called to instances where streets have been torn up for repairs of various kinds at different times under different departments, a large percentage of which was avoidable and unnecessary had there been greater co-ordination in the work between the Water Pipe Extension Division, Bureau of Streets and Board of Local Improvements.

Further co-operation between the Board of Local Improvements and these bureaus in planning and directing the laying of improved pavements would decrease the cost and periodical tearing up of pavements and the inconvenience attached thereto. The Board of Local Improvements employs from 50 to 100 paving inspectors at certain seasons of the year who inspect the construction of new improved pavements. It appears entirely feasible that these employes report all conditions which affect the work of the Bureau of Streets and other city departments while carrying on their work in the field.

The division of responsibility and jurisdiction between the Board of Local Improvements and the Bureau of Streets in the matter of work by private contractors on sidewalks and pavements is the cause of considerable controversy. While the responsibility of such work lies with the Superintendent of Streets, in that his approval is required, this work is now being done under the Sidewalk Division and

Street Division of a different department. It was not contemplated by the special assessment law that the Board of Local Improvements would take care of any work in the construction of pavements, sewers and sidewalks, except where the cost of such construction is paid for wholly or in part by special assessment. It would be desirable that this question of jurisdiction be taken up when the matter of the consolidation of the bureaus within the Department of Public Works is determined upon.

Another instance of overlapping is shown in the case of work of sanitary inspectors of the Bureau of Sanitation, Department of Health, and section foremen and inspectors of the Bureau of Streets. While the former inspectors are making regular inspections of sanitation of homes and buildings, as required by the city ordinances, the section foremen and inspectors of the Bureau of Streets devote considerable time in inspecting the character of receptacles which are provided for the storage of garbage and rubbish and the manner of separation and littering of streets and alleys. It would be desirable and practicable to have sanitary inspectors see to these important sanitary matters and prosecute the owners and tenants in buildings where receptacles for storage of garbage and rubbish or separation of same are not in accordance with the city ordinances and good sanitary practice.

In the course of the field study many private scavengers were found who still retained their old wagons and hauled garbage in uncovered wagons which are both unsanitary and offensive. The Department of Health could greatly assist the Bureau of Streets by insisting on the enforcement of existing ordinances relating to kind of vehicles and manner of collecting garbage and refuse by all persons or corporations doing garbage scavengering within the city limits.

Co-operation of building inspectors of the Department of Buildings with the Bureau of Streets would greatly assist the Bureau of Streets in determining if permits have been issued for the occupation of streets and alleys, and whether the storage of material was confined to the area specified, where permit has been issued.

In the course of the investigation the attention of the Department of Police was called to the assistance which the uniformed force could render the Bureau of Streets in apprehending and prosecuting the offenders of the city ordinances relative to street obstructions and permits for street openings, unsanitary conditions of alleys, non-removal of refuse from alleys, vacant lots and public thoroughfares, and the serving of notices for providing proper waste receptacles. All this general inspection work of a visual character, which is now being done by inspectors in the different bureaus, can easily be cared for by patrolmen while traveling beat, without loss or additional expense, or hampering police efficiency.

The enforcement of the ordinances by the Department of Police in the matter of the regulation of bone picking from garbage receptacles in alleys would have a good effect upon the number of so-called "bone pickers" who are scavengering in different sections and stealing important parts of the garbage.

In course of the study of the equitable distribution of the wheel tax for repair of streets in different sections of the city, the question of methods which are now used in collecting this tax was considered. While the records of the City Collector's office and the Department of Police showed that there has been an increase in the number of vehicles taxes and the amounts collected, investigation in the field showed that an appreciable percentage of vehicles were going about without city licenses.

A two days' inspection of approximately 1,000 cars in the loop district disclosed that about 5 per cent of the cars were without city licenses. A similar inspection for the same period was made in and about different freight railway terminals, and this shows that approximately 15 per cent of the vehicles were operating without vehicle license tags. These percentages appear great when it is considered that the Vehicle Bureau of the Department of Police concentrates most of its work in the central part of the city. Violations of this character not only operate as a loss to the city, but are unfair to the majority of owners who pay such license.

A more thorough investigation on the part of the Vehicle Bureau of the Department of Police and further co-operation between the City Collector's office and the Police Department should greatly decrease the number of vehicles now going about

the city without wheel tax tags, and thereby increase the funds which are necessary to maintain the city pavements.

It would appear that if special instruction were given to all patrolmen on their beats to report violations of the wheel tax ordinance, and that if notifications to vehicle owners were sent by the City Collector's office beginning April 1st of each year instead of May 1st as at present, the number of tardy vehicle owners would be decreased to a minimum.

Numerous instances have been found where people in certain parts of the city, and especially in the densely populated sections, continue to violate the ordinances as regards proper provision of household receptacles and throwing rubbish and litter onto the streets and alleys, even after they have been duly warned by the Ward Superintendents or their assistants. After the Ward Superintendent has notified residents of such violations and they still continue to violate such ordinances, the Ward Superintendent is often handicapped because of the non-suiting of such cases when brought to court. In many cases it has been practically impossible for Ward Superintendents to obtain a conviction of an offender, regardless of how flagrant the offense or how conclusive the proof. This is particularly true of violations of ordinances as to contractors occupying more space in streets than is permissible in the ordinance, and also to the prevention of teamsters from dumping dirt and refuse in alleys and subways. With proper co-operation of the residents and the law department there will result greater decrease in the number of violations, and it will assist the city in giving more effective and sanitary service.

The above are a few instances of overlapping of municipal activities which can be avoided by co-operation and co-ordination between departments. All such work, where it entails reports from men, could be made on simple blank report forms by employes as a regular routine, and be transmitted to the respective departments, where they would be followed up by their own forces where deemed necessary. This method of co-ordinate and systematic reporting will abate many violations of laws and ordinances and at the same time materially decrease the expenditures, and this without loss of time or hampering the efficiency of any department.

COMPENSATION OF EMPLOYES.

It is a well recognized principle among private corporations and in many public institutions that prompt and due recognition must be made for ability and efficiency in the performance of duties to secure and maintain good service. This is being accomplished by the provision of differentiations in the compensation of employes, based upon merit and seniority, and by promotion to higher duties of the efficient and ambitious. Such recognition in the Bureau of Streets has been until recently more or less impossible because no uniform standards or units of work have heretofore been established upon which efficiency and ability of employes could be fairly and relatively determined.

The studies made during this investigation have resulted in the installation of uniform schedules and standards for the cleaning of streets and alleys and the collection of garbage and wastes. A definite closed record system has also been prepared which, if maintained, will make it possible to measure the relative efficiency of individual employes.

For the purpose of recognizing seniority and ability in a position and incentive to greater efficiency, it is recommended that sliding scales of compensation for positions in the Bureau of Streets be adopted similar to those now in effect for other positions in the city clerical, engineering, police and fire services. This wage scale should provide that all employes be certified and appointed at the minimum salary rate, and advancement from the lower compensation rate to the next higher limit be made on the basis of efficiency and seniority of service in the bureau. Retention, lay-off and reinstatement should be based on the seniority and efficiency of employes as shown by records thereof kept in the office of the Bureau of Streets and the Civil Service Commission.

Such sliding compensation provisions should be made for all offices and places in the Bureau of Streets, including street cleaners, section foremen, etc. By the adoption of such sliding scales, recognition of ability and efficiency will be established and greater incentive to maintain high standards inculcated among all officers and employes.

At present, however, street sweepers are paid at the rate of $2.25 per day, irrespective of seniority or efficiency. It is recommended that the following salary scale be adopted for all street sweepers in the Bureau of Streets:

Group C—All probationary street cleaners entering the city service who have not yet attained the established standard and have been employed for less than 6 months—$2.00 per day.

Group B—Street cleaners who have maintained the established standard and have been in the service of the city as such for less than 1 year and more than 6 months—$2.10 per day.

Group A—Street cleaners who have maintained the established standard and have been in the service of the city as such for a period of over 1 year—$2.25 per day.

At the recommendation of the Efficiency Division last year the Committee on Finance of the City Council included in the 1913 appropriation ordinance a wage scale providing for the automatic advancement of section foremen in the Bureau of Streets. Owing to the stringency in city funds at that time, which was occasioned by the interpretation of the Juul law by the Supreme Court, the Finance Committee felt that it could not allow a salary higher than $2.75 per day for section foremen, the minimum salary being $2.50 per day.

In order that the work in the supervision and control of the field forces of the Bureau of Streets be maintained at a high standard, the position of section foreman should be raised to a higher standard and the pay placed sufficiently high to interest young and able men to apply for this position, which should be classified under a grade which provides for a written examination.

By providing a sliding wage scale for section foremen beginning at $2.50 per day and advancement on seniority and efficiency to $2.75 and $3.00 per day, it is believed that a larger number of such men will be interested to enter this important work. While it may cost the city a little more after these men have been in the city service for the period below designated, the returns in more efficient work will make up this cost several times over. It is accordingly recommended that the following sliding scale for section foremen take the place of the scale of $2.50 and $2.75 per day now paid to these employes:

Group C—All section foremen regularly certified from civil service lists who have been employed in the city as such for less than 1 year—$2.50 per day.

Group B—All section foremen regularly certified from civil service lists who have been in the service of the city for more than 1 year and less than 2 years—$2.75 per day.

Group A—All section foremen regularly certified from civil service lists who have been in the employ of the city over 2 years—$3.00 per day.

CONTROL OF LABOR EMPLOYMENT.

The Civil Service Commission under the city civil service act is given no authority over common labor employment in this city other than to maintain eligible lists for laborers. The Commission now maintains eligible lists for all street laborers, these lists being grouped according to wards in which they reside. The Commission has no control over the hiring of drivers and teamsters in the Bureau of Streets, as these are now provided by the contractors furnishing the teams and wagons.

An idea of the number of employes engaged and the compensation paid is given in the following summary of the average number of teams, skilled laborers, section foremen and street laborers employed by the Bureau of Streets during the past year:

Divisions	Teams	Laborers and Foremen								Total
	$5.50	$4.00	$3.75	$3.50	$3.00	$2.75	$2.50	$2.25	$2.00	
Garbage collection.	158	....	....	....	....	22	....	22	69	271
Rubbish collection.	386	....	....	....	....	28	5	26	60	505
Street cleaning.....	106	....	28	....	....	50	15	292	918	1409
Emergency work...	8	....	2	....	....	1	1	6	13	31
Wheel tax repairs.	12	16	....	3	30	8	3	....	121	193
Street restoration repair	½	....	....	....	....	29	....	....	44	73½
Dumps	1½	....	....	....	....	13	....	44	....	58½
Loading stations...	½	....	....	....	....	7	2	20	....	29½
Total 672½		16	30	3	30	158	26	410	1225	2570½

Because of the present residence limitation in the assignment of the street employes and the unquestioned right of discharge by those in charge of laborers, it has been a task for the Civil Service Commission to have available a sufficient number of eligibles in a large number of the wards of the city, and the Ward Superintendents have experienced similar difficulty in obtaining and keeping competent laborers.

Investigation of conditions and methods used in the assignment, efficiency, control and discharge of the above laborers discloses that the control of labor at present is not vested in any one department. It has also been found that the assignment of laborers and section foremen within the residence limitation has had the effect of handicapping the Superintendents in wards where there is insufficient labor in maintaining the standard of service rendered by Superintendents in wards having a sufficiency of labor.

The necessary practice of transferring laborers from the latter wards to other wards has a further tendency to demoralize the work in both and gives the laborers little or no assurance of continuous employment. This necessarily does not tend to efficient and economical work. The installation of uniform schedules for street and alley cleaning has brought forth this employment problem more pointedly than ever before. While some Ward Superintendents have laborers who can maintain and go above the standard of work required, other Ward Superintendents, whose supply of laborers is limited and who cannot pick them from other wards, find it difficult to maintain the uniform standard of service.

The ideal solution of this employment problem is in the control of the entire employment by a bureau of labor, which bureau should be under the city employment body and have control over the classification, assignment, lay-off, advancement and discharge of all laborers. The labor force then would be placed solely under the civil service and the only grounds for retention, promotion or discharge would be on the basis of efficiency and seniority of service.

The present labor condition in the Bureau of Streets work can be greatly remedied by the provision that in future examinations for street cleaners, street repair men and section foremen, the eligible lists be prepared according to definite districts of the city, these districts to be based upon the supply and demand of laborers in the wards included within each district. In the assignment of men to any section within a district, consideration would be given to nearness of their homes and availability of street car service.

The five district eligible lists now used by the Civil Service Commission in the assignment of laborers for other city bureaus using large numbers of laborers, viz., the Water Pipe Extension Division and Bureau of Sewers, have been working out satisfactorily. The study of the relative difficulties of obtaining laborers in different sections of the city discloses that these five districts could also, for the first examinations at least, be used in the assignment of section foremen and laborers on street cleaning and wheel tax repair in the Bureau of Streets.

CONTROL OF TEAMS AND DRIVERS.

The present methods used in the hire of teams and wagons and the assignment of teamsters by the contractors for the collection of refuse and ashes are generally uneconomical and ineffective because of the division of responsibility and ownership.

The majority of men employed in this branch of the service do not own their teams and are of a class that is not susceptible to thorough discipline. Investigation has revealed that in districts where teams employed by the city were driven by their owners, the service rendered and the discipline observed by these men were of a higher standard than in districts where these conditions did not exist. If the control of both teams and drivers would be accomplished, more efficient service could be obtained, as the primary loss to the owner would be such that he would exercise greater care in selecting the driver.

It would appear that the ideal solution to this divided ownership and control lies in the municipal ownership and control of all wagons and horses. This practice is now applied in the case of police and fire departments in this and other cities of this country and in the street cleaning and refuse collection departments of New York City, Boston, Washington, etc. These changes may not, under present conditions, be advisable or possible, but this is the ultimate solution, after absolute control of employment and service is vested in one city department.

As a step to this ultimate plan, the Bureau of Streets should require in its rules and in the contracts drawn up with the different owners of wagons and teams, that the teamsters who are assigned with the wagons and teams work under the strict supervision and control of the Ward Superintendents.

EFFICIENCY RECORDS.

Unscientific distribution of work and lack of uniform standards and units have precluded the possibility of definitely ascertaining or determining the effectiveness of the work or efficiency of employes. The installation of the uniform schedules for the cleaning of streets and alleys, and collection of the city wastes, and the adoption of the uniform record system will make it possible to definitely ascertain the efficiency of both employes and service.

The daily service reports which are sent into the ward offices by the section foremen in the different parts of the city, of the number of men and teams at work, and the amount and character of work performed by each, should be checked up by the Ward Superintendents in each ward office and by the planning and inspection staff in the central office. The unit costs determined should be used as a basis for ascertaining and recording individual efficiency of each member and employe of the bureau.

In order that the work of determining the efficiency of employes be simplified, it is recommended that three factors be used, viz., attendance, discipline and quality and quantity of work performed. Rules governing the former have already been applied in the different departments for some time. The latter factor, viz., quality and quantity of work will be easily ascertained from the records above referred to.

The efficiency markings of all employes should be kept on individual history cards in the different ward offices, which should be open at all times for the inspection of the employes. The average monthly efficiency markings should be kept in a permanent record in the central office of the Bureau of Streets and in the office of the Civil Service Commission.

INSTRUCTION—RULES AND REGULATIONS.

The detailed time studies of the work of street cleaners which were made during the course of this investigation disclosed that a large proportion of the laborers have not the slightest notion of the right methods of performing their work, in using their brooms and shovels, or in hauling street dirt. Similar conditions obtained in the case of the section foremen and of the men working in gangs.

The need of specialized instruction in the manner of performing duties is now well recognized in both private and public services. An employe should be so placed that he can do thoroughly well the things which pertain to the place he fills. The time seems to have passed when laborers picked up from the streets can be sent

to do work effectively and with the minimum waste of energy and time, where such work requires a knowledge of best methods of doing the work.

Instruction in the manner of performing work in street cleaning would take a relatively short time, and should be required of all laborers. Such instruction would eliminate a great portion of unproductive work and at the same time conserve the strength of the employe. It is recommended that street cleaners and section foremen be given instruction in best methods of performing their duties, and that it should be continued through proper supervision by the Ward Superintendent and inspection by the general planning staff detailed from the central office. With control of labor and thorough instruction and supervision, the competent and ambitious will be rewarded and the incompetent eliminated, and effectiveness and economy of service generally increased.

All officers and employes should be given every opportunity of being informed on new methods of performing their duties, and of changes in departmental rules and regulations. This can be accomplished through bulletins distributed regularly in the district offices and in the central office.

While orders have been issued from time to time from the central office calling attention of employes to changes in regulations and methods, no complete set of rules and regulations is available for the guidance of the employes in carrying on the different activities of the street bureau. The need for a comlpete set of definite rules and regulations, definitely fixing methods to be pursued, is great and same should be prepared and distributed to all employes at the earliest time.

DIVISIONS OF CITY.

Table I gives the details of the moneys appropriated and expended by wards during each of the years from 1905 to 1912 inclusive, as well as the blanket amounts appropriated and spent for miscellaneous work and the overhead charges for these years. These figures show no definite relation to the actual needs and requirements of these sections of the city, and indicate clearly the unscientific and inequitable distribution of funds and work throughout the city.

The changes in the ward lines and changes in representatives in the City Council, transfers of officers and employes from ward to ward, and the lack of uniform schedules for carrying on work throughout the city have, separately and collectively, had a great deal to do with the effectiveness of the administration of the street bureau activities. This has been brought forward clearly since the beginning of the present investigation into the conditions and methods used in the different sections of the city.

With the installation of uniform schedules for the cleaning and repair of streets and alleys and for the removal of municipal wastes, now practically accomplished throughout the city the reason for limiting appropriations and expenditures and confining these important city activities within ward lines is now greatly minimized. Under the system whereby service is rendered on a basis of actual needs and requirements, the responsibility for effective and economical work will be centralized and incentive and initiative be secured and maintained. This will aid City Council representatives and the administration, and give general satisfaction to the citizen body.

The city should be divided into divisions and districts according to the physical characteristics, population and general tendencies existing in the city. The appropriation and expenditures for the Bureau of Streets' activities should be made for the entire city, and service should be based on the actual needs and requirements of each division or district. Under this scheme the present ward lines would be erased in so far as the activities of the Bureau of Streets are concerned, and the city be divided into four or five divisions, and each division would be divided into six or seven districts. The area embraced in each district will be based upon the study of the general physical characteristics, character and density of population. Each dis-

trict will consist of a number of the street cleaning, garbage and rubbish sections now used in the assignment of work to the sweeping and carting forces.

By the adoption of the recommendations given above, the returns in service rendered and satisfaction will not only be of advantage to the City Council representatives and the community as a whole, but will greatly assist the administration of these activities. The line of authority will be definitely fixed, and opportunity for promotion and advancement to the higher grades to employes in the service will be increased. All these considerations generally tend to effective and economic service throughout the city.

SUMMARY OF RECOMMENDATIONS.

The following is a summary of the recommendations included in this report:

1. That the Bureau of Sewers and Bureau of Compensation be consolidated with the Bureau of Streets so that the responsibility for the more important activities now covered by these bureaus be more centralized and the administration of these activities be under the direct responsibility and scrutiny of one official directly responsible to the Commissioner of Public Works.

2. That the division of sewer pumping stations, now under the Bureau of Sewers, be placed under the operating section of the division of water pumping stations in the Bureau of Engineering.

3. That the inspection of house drains, and the licensing of drain layers be transferred from the present Bureau of Sewers to the Department of Health.

4. That the division of benches and grades be transferred from the present Bureau of Sewers to the Bureau of Maps and Plats.

5. That the question of jurisdiction over work by private contractors on sidewalks and pavements between the Board of Local Improvements and the Bureau of Streets be considered when the matter of the consolidation of the bureaus within the Department of Public Works is accomplished.

6. That the section foremen, street repair foremen and laborers who are now assigned to take care of the central and ward office records, and who receive amounts varying from $2.25 to $2.75 per day, be assigned to perform work as laborers, and that a junior clerk, at the rate of $840 per year, be assigned to do this work. These clerks should be obtained by special examination, and should be required to take care of all records in the central and ward offices, and perform such other work as may be required from time to time by the superintendent.

7. That provision be made for a staff of technical assistants, working under the direction of the Superintendent and Assistant Superintendents of Streets, to study conditions, methods and work in different sections of the city, and assist the different Superintendents in maintaining uniform service and methods throughout the city.

8. That this staff be required to furnish the central office information on the effectiveness and economy of service rendered, act as inspectors on complaints received at the central office, and perform such other technical and engineering work as is required from time to time.

9. That the present engineering organization provided for the division of street repairs in the Bureau of Streets be required to take care of all such engineering, planning and inspection work, and that the technical help in the Bureau of Sewers be consolidated with this technical staff with the consolidation of these two bureaus.

10. That this staff, in carrying on the work of planning and making time and traffic studies, be also required to assist Ward Superintendents in maintaining uniform systems and in the instruction of employes in advanced methods of doing work.

11. That there be created a position of planning engineer, who shall be in direct charge of the planning and engineering section, and be held responsible for the efficiency of the staff.

12. That the Ward Superintendents be held responsible for the street repair work being done in their respective wards and that extensive asphalt and brick repair work be done under the general supervision of the central office, so that the work will be distributed and done uniformly throughout the city.

13. That an assistant superintendent of street be placed directly in charge of the proposed division of permits.

14. That the House Moving Inspector, who now reports directly to the Superintendent of Streets, be assigned to the permit division and report to the public utility inspector in charge.

15. That possible combination of the yards, shops, supply stations and offices of the Bureau of Streets, Bureau of Sewers, and Water Pipe Extension Division of the Bureau of Engineering be considered in connection with the consolidation of the Bureaus of Sewers and Streets.

16. That plans be prepared and efforts made to co-ordinate the activities of the Bureau of Streets with those of the Departments of Law, Health, Buildings, Police and Board of Local Improvements in order to secure mutual aid and assistance in preventing duplication of effort and the enforcement of laws and ordinances regarding sanitation, littering of streets, alleys and vacant lots and street openings and obstructions. To that end it is suggested that the departments affected delegate an officer or employe thereof, as a member of a joint board, to consider and report such a plan.

17. That the Board of Local Improvements co-operate more closely with the Bureau of Streets and other departments and bureaus in planning and construction of new pavements.

18. That as a means of co-ordination of departments, systematic reports of violations noted by different departments be made on simple forms by employes as regular routine and same be exchanged by the departments affected.

19. That for the purpose of recognizing seniority and ability in a position and incentive to greater efficiency, a sliding scale of compensation for laborers and section foremen in the Bureau of Streets be adopted in accordance with the scales included in this report and that certification and appointment be made at the minimum salary rate and that advancement from the lower rate to the next higher rate be made on the basis of asertained efficiency and seniority of service in the bureau.

20. That the position of section foreman be classified under a grade which provides for higher standard of training and more knowledge than required ordinarily of laborers.

21. That in future examinations for street cleaners, street repair men, and section foremen the eligible lists be prepared according to different districts of the city rather than by wards, these districts to be determined upon according to the supply and demand of laborers in the sections included within each district.

22. That the Bureau of Streets require in its rules and in the contracts drawn up with different owners of refuse wagons and teams, that the teamsters assigned with the wagons and teams work under the strict supervision and control of the Ward Superintendents.

23. That daily service reports be sent in to the ward offices by the section foremen and same be checked up in the ward offices and in the central office, and the unit costs be used as a basis for ascertaining and recording the individual and group efficiency of the organization in each ward throughout the city.

24. That the factors of attendance, discipline and quality and quantity of work performed be used in determining the efficiency of employes.

25. That the efficiency markings of all employes be kept on individual history cards in the different ward offices, which shall be open at all times for the inspection of the employes, and that the average monthly efficiency markings be kept in a permanent record in the central office of the Bureau of Streets and in the office of the Civil Service Commission.

26. That all officers and employes be given instruction and opportunity of being informed on new methods of performing their duties, and of changes in departmental rules and regulations through the regular distribution of bulletins in the district offices and in the central office.

27. That a complete set of definite rules and regulations and instructions to employes in the bureau be prepared and furnished to all employes.

28. That with the installation of uniform schedules and service for cleaning and repair of streets and alleys and for the removal of municipal wastes, the city be divided into divisions and districts according to the physical characteristics, population and general tendencies, and that appropriation and expenditure for the Bureau of Streets be made for the entire city on the basis of the actual needs and requirements.

Respectfully submitted,

(Signed) J. L. JACOBS,
Efficiency Engineer in Charge.

APPROVED:

(Signed) JAMES MILES,
Examiner in Charge, Efficiency Division.

APPENDIX "B"

SPECIFICATIONS FOR UNIFORMS OF EMPLOYES

WHITE DUCK SUITS.

Coats—Material—The material shall be of 8 ounce, unbleached duck.
Style—Single breasted, 4 button, medium fitting, square cornered sack, double stitched, reinforced seams and single stitched edge, length to be about 4 inches below trouser waist line.
Collar—1½-inch standing military collar.
Cuffs—Imitation stitched, 1½-inch deep.
Pockets—One upper breast pocket on left hand side.
Buttons—Four brass Chicago buttons (removable).
Reinforcement—The right side, under the sleeve, shall be reinforced with a piece of 8-ounce duck, the same as the material on the coat, about 12 inches wide and 18 inches long.

Trousers—Material—The material shall be the same as for coat.
Style—Medium cut, loose fitting, seams double stiched, reinforced, slit to be three-button fly front, crotch seam to be stayed, to be made with draw string belt.
Pockets—Two front and one hip pocket, corners stayed.

KHAKI UNIFORMS.

Coats—Material—The material shall be of fast color khaki, simliar in quality and shade to sample, Exhibit 1.
Style—Single breasted, unlined, medium loose fitting, 5-button, buttoning to neck, length about 4 inches below trouser's waist line, seams double stitched, reinforced, edge single stitched.
Collar—1¾-inch military, turn-down collar.
Cuffs—Cuffs on sleeves.
Pockets—One upper breast pocket in right side.
Buttons—Five brass Chicago buttons (removable).

Trousers—Material—The material shall be the same as the material for coat.
Style—Medium loose fitting, seams double stiched and reinforced, edge single stiched, slit to have three buton fly, crotch seams to be stayed, to be made with regular waist line.
Pockets—Two front and one hip pocket, corners stayed.

BLUE UNIFORMS.

Coats—Material—The material shall be fast color blue of the same quality and shade as sample—Exhibit 2.
Style—Single breasted, 5 button, high lapelled, button through.
Pockets—Two side pockets, one cleft outside breast pocket, pockets and straining points reinforced.
Collar—Turn-over collar 1¾ inches at back, graduating to 2½ inches at points.

Buttons—Five brass Chicago buttons (removable).

Trousers—Material—Same as for coat.
Style—Medium loose fitting, seams double stitched and reinforced, 1½ inch seat seam outlet, edge single stiched, slit to have four buttons, fly front, to be made with regular waist line.
Pockets—Two regular side, one watch and two hip pockets.

SUMMER CAPS (1).

Shall be slightly bell shape; shall be made over a celluloid frame and two separate white duck covers.

Frame—Shall be made in two sections; upper part of black celluloid; lower part of No. 1 pressed board, covered with white duck with a welt ¼ inch from base of frame.

Visor—Shall be made of white imitation leather 2¼ inches wide and sewed to base of frame; upper part covered with a white celluloid and bound with white leather; green skiver lined.

Sweat Band—Shall be made of turned solid leather, 1⅞ inches wide; joined to visor in front and over-hand stitched around back.

Cover—Shall be made in three sections of white duck; 8x7¾ inches in diameter. The side in two sections; 3 3/7 inches high; stiched to crown; one eyelet on each side, directly over end of visor.

Buttons—Two small gilt Eagle Prong (Chicago emblem); fastened through cap; one on each side, directly over ends of visor.

SUMMER CAPS (2)

Shall have straight sides; made over a celluloid frame; two tan khaki covers.

Frame—Shall be made in two sections; upper part of black celluloid; lower part of No. 1 pressed board, covered with a white duck with a welt ¼ inch from base of frame.

Visor—Shall be made of black imitation leather 2¼ inches wide and sewed to base of frame; upper part is of black glaze; lower part of green skiver, bound with black leather 2¼ inches wide.

Sweat Band—Shall be made of turned solid leather, 1⅞ inches wide; joined to visor in front and over-hand stitched around back.

Cover—Shall be made in two sections of tan khaki; 8x7¼ inches in diameter; the side in one piece; stitched to crown; one eyelet on each side, directly over end of visor.

Buttons—Two small gilt Eagle Prong (Chicago emblem); fastened through cap; one on each side, directly over ends of visor.

WINTER CAPS.

Shall be made of imitation white leather with an inside cape to pull over ears.

Frame—Shall be made in two sections; upper part of black celluloid; lower part of No. 1 pressed board; height 3½ inches; covered with a heavy felt stitched to base of frame.

Visor—Shall be made of an imitation leather 2¼ inches wide joined to base of frame; covered with white celluloid; bound around edge with white leather; green skiver lined.

Sweat Band—Shall be made of same material as lining, 1⅞ inches wide; stitched to base of frame with over-hand stitches ⅛ inch apart.

Lining—Shall be made of a good quality black Albert twill, heavily padded with wadding and milnet.

Ear Cape—Shall be made of white imitation leather; lined with wool cloth and sewed to lower part of sweat band.

Cover—Shall be made in three sections; 8¼x8 inches in diameter; the sides in two sections; joined to crown; height 3½ inches.

Buttons—Two small gilt Eagle Prong (Chicago emblem), fastened through cap; one on each side, directly over ends of visor.

APPENDIX "C"

OUTLINE DESCRIPTION OF FORMS OF PROPOSED RECORD SYSTEM

The closed record system and uniform forms recommended in the body of the report are reproduced herewith, and a short description of the purpose and use of each form follows:

FORM NO. 1.

Subject: Garbage collection.
Period: Daily.
Submitted by: Foreman.
Size: 6⅓"x12".
Sheet.

These forms are to be supplied in a blank book. They are to be filled out by the foremen and submitted to the ward clerk, who is to use them for the purpose of filling out form No. 2, which is a summary of the information contained on form No. 1.

These reports should be kept for reference for a limited period, so as not to encumber the ward office files.

Each form provides for the supervision of seven districts and gives the details of place, of team and man number, and the time spent on haul and collection, for each team employed.

FORM NO. 2.

Subject: Garbage collection.
Period: Daily.
Submitted by: Clerk.
Size: 5"x8".
Sheet.

From the information contained on form No. 1, and from routes shown in pencil lines on properly prepared maps, the ward clerk is to supply the information in obtaining the unit costs of work required by this form.

This form shows total cost and the unit cost of work and distances covered by the teams. Each form provides for seven districts, but where more than seven districts are established in a ward, an additional sheet may be used.

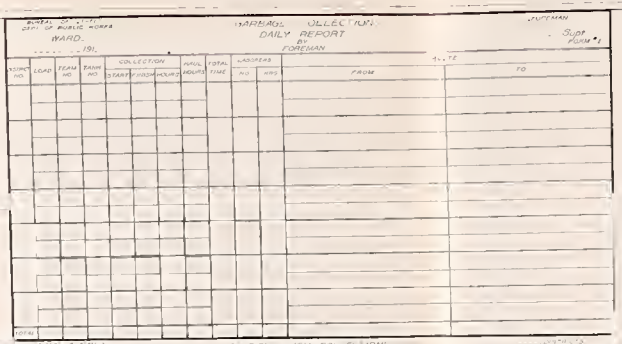
Summaries of the information given by form No. 2 are made periodically either monthly or semi-monthly on form No. 3, and a copy submitted to the main office.

FORM NO. 3.

Subject: Summary—garbage collection.
Period: Monthly or semi-monthly.
Submitted by: Clerk.
Size: 5"x8".
Card: In duplicate.

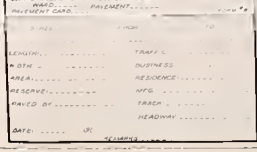
The information given on this form summarizes the number of loads collected, distance traveled, total and unit costs of work for each district, and for all districts, and gives the measure of efficiency of the foremen in charge of the various districts.

PLATE XXVI.



FORM #1
BLUE SHEET
DATA OF THIS FORM TO BE KEPT BY FOREMAN FROM OWN OBSERVATION AND BY DATA FURNISHED BY DRIVERS AND RECORDED BY FOREMAN

FORM #2
BLUE SHEET
DATA OF FORM TO BE KEPT BY FOREMAN FROM OWN OBSERVATION AND BY DATA FURNISHED BY DRIVERS AND ENTERED BY FOREMAN



FORM B
3 X 5 CARD
ONE SECTION STREET CLEANING CARDS TO BE GROUPED TOGETHER INTO SECTIONS, SECTION NUMBERS TO BE PENCILLED ONLY
REQUIRES A CARD FOR EACH STREET BETWEEN SUCCESSIVE INTERSECTIONS
PROVIDES FOR DAILY CHANGE IN DISTRICTS OR YARDS

INVESTIGATION OF
BUREAU OF STREETS
DEPARTMENT OF PUBLIC WORKS
CITY OF CHICAGO

Efficiency Division-Civil Service Commission Sept 1913

FORM 3
8½ x 14"
DATA ON THIS FORM TO BE ENTERED DAILY IN CLERK FROM FOREMANS DAILY REPORT

DEPT. OF PUBLIC WORKS
BUR. OF STR. & ALLEY
WARD...
DATE...191

GARBAGE COLLECTIONS
DAILY REPORT
By Clerk

Supt
FORM 3

DISTANCE			COST				WEIGHT			COST	
COVERED	TOTAL	DISTRICT	TEAM	LABOR	EXTRA TEAM	TOTAL	PER LOAD	PER DAY	PER TON	DISTRICT NO.
TOTAL										

FORM 4
8½ CARD
DATA ON THIS FORM TO BE ENTERED BY CLERK FROM DAILY REPORTS

DUPLICATE TO BE SENT TO MAIN OFFICE WHERE A WARD HAS MORE THAN 20 STREETS USE ADDITIONAL CARDS AS REQUIRED

DEPT OF PUBLIC WORKS
BUREAU OF STREETS
RUBBISH & ASH COLLECTIONS
For month of
...191...
DISTRICT
Supt
FORM 4

STREET NO	FOREMAN	NUMBER		YARDAGE		COST		
		LOADS	LOADS COVERED	TOTAL	DAILY	TOTAL	DAILY	PER YARD
TOTAL								

FORM 5
7-8 CARD
DATA ON THIS FORM TO BE ENTERED BY CLERK FROM DAILY REPORTS

DUPLICATE TO BE SENT TO MAIN OFFICE

DEPT OF PUBLIC WORKS
BUREAU OF
WARD
DAYS
GARBAGE COLLECTIONS
Summary for month of
191...
Supt
FORM 5

DISTRICT	FOREMAN	WEIGHTS				COSTS					
		LOAD	DISTRICT TOTAL	LOAD	DAY	TEAM	LABOR	TOTAL	PER DAY	PER T
TOTAL										

FORM 6
3½ SHEET
DATA ON THIS FORM TO BE ENTERED DAILY BY CLERK FROM FOREMANS DAILY REPORT
PROVIDES FOR 13 SECTIONS PER SHEET WHERE THERE ARE MORE THAN 13 SECTIONS PER WARD CARRY SUB TOTAL TO TOP OF NEXT CARD

DEPT OF PUBLIC WORKS
BUREAU OF STREET CLEANING
WARD
CARD
STREET CLEANING
DAILY
...191
Supt
FORM 6

SECTION NO	HUMAN NO	LOADING TIME		AREA PAVEMENT YARDS				CLEANED	IMPROVED	UNIMPROVED	COUNTRY	COSTS		
		STARTED	FINISHED	TOTAL	1	2	3	TOTAL	%	CLEANING	ASPHALT	BRICK	CONCRETE	TOTAL
TOTAL														

FORM 7
8½ CARD
DATA ON THIS FORM TO BE ENTERED DAILY BY CLERK FROM FOREMANS DAILY REPORT

DUPLICATE TO BE SENT TO MAIN OFFICE
PROVIDES FOR 13 SECTIONS PER CARD WHERE THERE ARE MORE THAN 13 SECTIONS PER WARD CARRY SUB TOTALS TO TOP OF NEXT CARD

DEPT OF PUBLIC WORKS
BUREAU OF STREETS
RUBBISH & ASH COLLECTIONS
DAILY REPORT
By Clerk
WARD...
DATE...191
Supt
FORM 7

DISTANCE			COST				LOADAGE	COST PER YARD	DISTRICT NO.
COVERED	TOTAL	LENGTH	TEAM	LABOR	EXTRA TEAM	TOTAL			
TOTAL									

FORM 8
8½ SHEET
DATA ON THIS FORM TO BE ENTERED DAILY BY CLERK FROM FOREMANS DAILY REPORT

NOTE - SUMMARY FORMS MAY BE SUBMITTED EITHER MONTHLY OR SEMI-MONTHLY

DEPT OF PUBLIC WORKS
BUREAU OF STREETS
STREET CLEANING
SCHEDULE
...191
DISTRICT
CARD
...SECTION
Supt
FORM 8

SECTION NO	HUMAN NO	DAYS	LOADS	TEAM	EXTRA LABOR	TOTAL	YARDS CLEANED A	B	C	D	TOTAL	COMPLETED IN 120 TOTAL	COUNTRY ROADS SENT TO ASPHALT	MONTHLY TOTAL OF TYPE YDS
TOTAL														

PLATE XXVII.

INVESTIGATION OF
BUREAU OF STREETS
DEPARTMENT OF PUBLIC STREETS
CITY OF CHICAGO
Efficiency Division Civil Service Commission Sept 1913

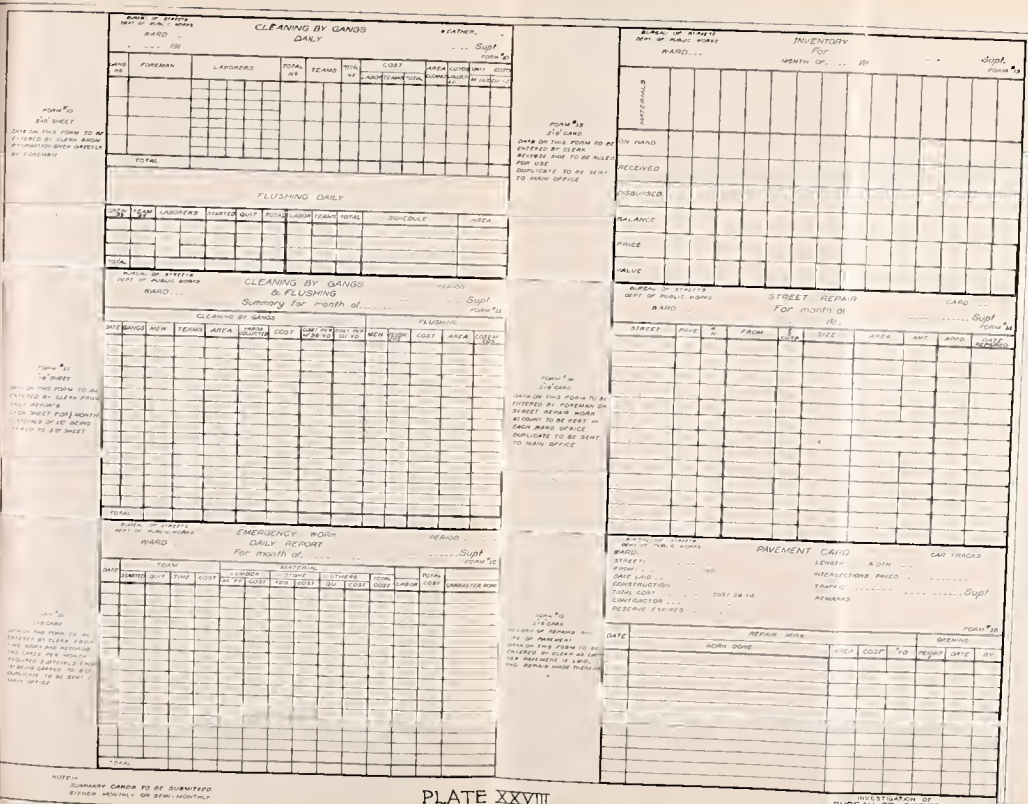


PLATE XXVIII.

INVESTIGATION OF
BUREAU OF STREETS
DEPARTMENT OF PUBLIC WORKS
CITY OF CHICAGO
Efficiency Division Civil Service Commission Sept 1913

FORM NO. 4.

Subject: Rubbish and ash collection.
Period: Daily.
Submitted by: Foreman.
Size: 6⅓"x12".
Sheet.

FORM NO. 5.

Subject: Rubbish and ash collection.
Period: Daily.
Submitted by: Clerk.
Size: 5"x8".
Sheet.

FORM NO. 6.

Subject: Rubbish and ash collection summary.
Period: Monthly or semi-monthly.
Submitted by: Clerk.
Size: 5"x8".
Card: In duplicate.

Forms Nos. 4, 5 and 6, which cover rubbish and ash collection are to be used in a similar manner as forms Nos. 1, 2 and 3, which cover garbage collection.

FORM NO. 7.

Subject: Sectional street cleaning.
Period: Daily.
Submitted by: Clerk.
Size: 5"x8".
Sheet.

The information required by this form is supplied by the ward clerk from the data furnished by other records and supplemented by the report turned in by the section foremen. This form gives the total time spent by each street cleaner, and the unit cost of such cleaning, including the cost of removal of street dirt by the teams.

These sheets are to be kept in loose leaf files for a limited period. The summaries contained therein are entered on form No. 9.

FORM NO. 8.

Subject: Street data.
Permanent.
Compiled by: Clerk.
Size: 3"x5".
Card.

This form supplies all information which is necessary in getting up the schedules for sectional street cleaning. For streets which are newly paved, the required information can be easily obtained by the ward clerk, and for streets which are already in use and covered by schedules, the information given in the schedules can be used.

It is purposed to group these cards (each indicating a street one block long), into sections required by schedules. If re-arrangement of the schedules is required, same will be done by re-arrangement of the street cards as occasion demands. This will do away with the need of re-writing each schedule, as has been found necessary in the past.

FORM NO. 9.

Subject: Summary of street cleaning by sections.
Period: Monthly or semi-monthly.
Submitted by: Clerk.
Size: 5"x8".
Card: In duplicate.

The information contained hereon is a summary of the information contained on form No. 7, and gives the total and unit cost of cleaning in each district for each kind of pavement.

FORM NO. 10.

Subject: Cleaning by gangs.
Period: Daily.
Subject: Flushing.
Period: Daily.
Submited by: Clerk.
Size: 5″x8″.
Sheet.

This form is to cover two activities, neither of which requires separate cards, the first part giving the totals and the unit cost of cleaning, where the gang system is in use, and the second part giving similar information regarding flushing, which is carried on in most wards during the summer months. The information contained in this form is summarized on form No. 11.

FORM NO. 11.

Subject: Cleaning by gangs.
Period: Monthly or semi-monthly.
Subject: Flushing.
Period: Monthly or semi-monthly.
Submitted by: Clerk.
Size: 5″x8″.
Card: In duplicate.

The information contained on this form is taken from the daily forms, and gives the monthly unit costs of each of these two activities. It also gives a measure of the relative efficiency of the foremen.

FORM NO. 12.

Subject: Emergency work.
Period: Monthly or semi-monthly.
Submitted by: Clerk.
Size: 5″x8″.
Card: In duplicate.

Emergency work occurs at irregular intervals, therefore, this form is to be a daily record as well as a periodic summary of such work. It gives the details of the activities and the costs of materials used on such work.

FORM NO. 13.

Subject: Inventory.
Period: Monthly.
Submitted by: Clerk.
Size: 5″x8″.
Card: In duplicate.

The purpose of this form is to show the amounts and value of materials received and on hand at the end of each month.

FORM NO. 14.

Subject: Street repairs.
Period: Monthly.
Submitted by: Foreman on street repair work.
Size: 5″x8″.
Sheet.

The information contained on this form will locate and give the unit cost of all repairs made on every street of each ward. The forms are to be kept in loose leaf binders for a limited time, the information to be taken from this form and entered on form No. 15, which is a record of the life of every pavement.

FORM NO. 15.

Subject: Pavement.
Permanent.
Submitted by: Clerk.
Size: 5"x8".
Card.

As each pavement is laid, a card is made out for it and the details of cost and construction are entered and the record of any repairs entered thereon from form No. 14 preceding this. At the end of a few years an intelligent idea will be obtainable of the value and maintenance cost of each pavement under varying conditions.

PRESENT FORMS.

Of the forms at present in use, a number will be used in connection with the above forms, and the others should be discarded, as indicated in the following:

Form No. 474—Detail of work performed daily, superseded by individual activity forms, Nos. 2, 5, 7, 9, 10, and 12.

Form No. P. W. F. 154—Daily force report to be filled out by ward clerks when they visit main office.

Form No. 463—Weekly report required by ordinance. This must be continued.

Form No. (no number)—Comparative monthly statement. This may be eliminated as the purpose of the new forms (Nos. 3, 6, 9, 11, 12, and 13) is to furnish such information quickly.

Form No. (no number)—Daily expense distribution. This is not required as the daily distribution is given on the sheets which may be submitted daily by form No. P. W. F. 154, and by the new summary reports above noted by number.

Form No. 471—Monthly report. This should be discontinued as this information is given on the new summary forms above noted by number.

Form P. W. F. 174—Foremen's daily report. This should be eliminated, as the information is given on the new forms, Nos. 1 and 4.

Form Nos. 192 and 193—Records of tools used. These should be continued. By a slight change in form 193 it is possible to eliminate the use of an extra time book and keep a record of the laborers' and teams' time on the master sheet, No. 193.

There are other forms in use in the ward offices, such as complaint blanks, voucher forms, requisition forms, etc., which have not been studied in this connection as they had no real bearing on the question of uniform record systems, efficiency control and unit costs, the main purpose of designing this new set of forms.

APPENDIX "D"

SCHEDULES FOR STREET AND ALLEY CLEANING

16TH WARD

Street	From	To	Pavement Class	Car Tracks Class	Clean per Week	Men Days	Total
Section 1							
Elston Av.	Fullerton Av.	W. S. of C.& N.W.Ry.	G 1	2 Gx	6	6.4	6.4
Section 2							
Elston Av.	W. S. of C.& N.W.Ry.	100′ south of Wabansia Av.	G 1	2 Gx	6	6.0	
2 Subways	Elston Av	C. M. & St. P. R. R. and C. & N. W. Ry.	B 1	2 Gx	6	0.4	6.4
Section 3							
Elston Av.	100 ft south of Wabansia Av.	Bradley St.	G 1	2 Gx	6	6.0	6.0
Section 4							
Elston Av.	Bradley St.	Division St.	G 1	2 Gx	9	2.3	
Division St.	W. S. of C.& N.W.Ry.	Chicago River	G 1	2 Gx	9	3.2	
Subway	Division St.	C. & N. W. Ry.	B 1	2 Gx	9	0.3	5.8
Section 5							
Division St.	East side of Milwaukee Av.	W. S. of C.& N.W.Ry.	G 1	2 Gx	9	6.1	6.1
Section 6							
Division St.	180′ east of Wood St.	East side of Milwaukee Av.	A 1	2 Gx	12	6.2	6.2
Section 7							
Division St.	180′ east of Wood St.	Robey St.	A 1	2 Gx	12	6.2	6.2
Section 8							
Noble St.	Division St.	Blackhawk St.	A 1	2 cobble	6	2.7	
Blackhawk St.	Noble St.	Holt St.	A 1	2 cobble	6	1.4	
Holt St.	Blackhawk St.	330′ n. of Blanche St.	A 1	2 cobble	6	2.0	6.1
Section 9							
Milwaukee Av.	Robey St.	Alley east of Evergreen Av.	G 1	2 Gx	12	6.1	6.1
Section 10							
Milwaukee Av.	Alley east of Evergreen Av.	125′ e. of Paulina St.	G 1	2 Gx	12	6.1	6.1
Section 11							
Milwaukee Av.	125′ east of Paulina St.	Division St.	G 1	2 Gx	12	4.1	
Ashland Av.	Division St.	830′ n. of Division St.	G 1	2 Gx	6	1.8	5.9
Section 12							
Ashland Av.	830′ north of Division St.	Alley north of Wabansia Av.	G 1	2 Gx	6	5.8	5.8
Section 13							
Clybourn Pl.	Paulina St.	Chicago River	G 1	2 Gx	6	3.5	
Ashland Av.	Clybourn Pl.	Alley north of Wabansia Av.	G 1	2 Gx	6	2.2	
Subways	Ashland Av.	C. M. & St. P. R. R.	G 1	2 cobble	6		
	Clybourn Pl.	C. & N. W. Ry.	G 1	2 Gx	6	0.6	6.3

Street	From	To	Pavement Class	Car Tracks Class	Clean per Week	Men Days	Total
Section 14							
North Av.	Robey St.	Ashland Av.	A 1	2 Gx	6	4.6	
North Av.	Ashland Av.	Holt St.	G 1	2 Gx	6	1.5	
							6.1
Section 15							
North Av.	Holt St.	Chicago River	G 1	2 Gx	6	4.2	
Holt St.	North Av.	330′ n. of Blanche St.	A 1	2 cobble	6	0.8	
Subway	North Av.	C. & N. W. Ry.	G 1	2 Gx	6	0.4	
							5.4
Section 16							
Winchester Av.	North Av.	Webster Av.	A 1		6	4.6	
Webster Av.	Robey St.	Elston Av.	A 1		6	1.7	
Subway	Webster Av.	C. & N. W. Ry.	B 2		6	0.1	
							6.4
Section 17							
Elk Grove St.	Wood St.	North Av.	A 1		6	1.1	
Lincoln St.	North Av.	Armitage Av.	A 1		6	3.3	
Lincoln St.	Armitage Av.	C. & N. W. Ry.	A 1		3	0.8	
Hervey St.	Robey St.	Wood St.	A 1		3	0.8	
							6.0
Section 18							
Girard St	Milwaukee Av.	Armitage Av.	A 1		6	4.4	
Girard St	Armitage Av.	C. & N. W. Ry.	A 1		3	0.5	
Clybourn Pl.	Robey St.	Wood St.	A 1		6	1.4	
							6.3
Section 19							
Wood St.	Milwaukee Av.	Webster Av.	A 1		6	6.0	
Subway	Wood St.	C. & N. W. Ry.	B 2		6	0.2	
							6.2
Section 20							
Hermitage Av.	North Av.	Armitage Av.	A 1		6	3.1	
Armitage Av.	Paulina St.	Elston Av.	A 1		6	0.9	
Subway	Armitage Av.	C. & N. W. Ry.	B 2		6	0.2	
Mendell St.	Canal Pl.	Clybourn Pl.	G 1		4	1.0	
Crossing St.	Elston Av	Mendell St.	B 1		2	0.2	
							5.4
Section 21							
Paulina St.	Division St.	Armitage Av.	A 1		6	5.4	
Keenon St	Ashland Av.	Wood St.	A 1		3	0.7	
							6.1
Section 22							
Wabansia Av.	Robey St.	C. & N. W. Ry.	A 1		6	3.7	
Holt St.	North Av.	Wabansia Av.	A 1		6	0.6	
Subway	Wabansia Av.	C. & N. W. Ry.	B 1		6	0.2	
Marshfield Av.	North Av.	Bloomingdale Rd.	A 1		6	1.2	
							5.7
Section 23							
Fontenoy Pl.	Park St.	Milwaukee Av.	A 1		6	0.4	
Park St.	Robey St.	Evergreen Av.	A 1		6	0.9	
Fowler St.	Robey St.	Evergreen Av.	A 1		6	0.6	
Evergreen Av.	Robey St.	Milwaukee Av.	A 1		6	1.2	
Potomac Av.	Robey St.	Lincoln St.	A 1		6	0.6	
Crystal St.	Robey St.	East End	A 1		6	0.4	
Lincoln St.	Milwaukee Av.	Ellen St.	A 1		9	1.6	
Alley	Evergreen Av. / Robey St.	Potomac Av. / Ellen St.	B 1		2	0.2	
Ellen St.	Lincoln St.	First alley west	B 1		6	0.1	
							6.0
Section 24							
Lincoln St.	Ellen St.	Division St.	A 1		9	1.6	
Marion Ct.	Ellen St.	Division St.	A 1		3	0.4	
Macedonia St.	Ellen St.	Division St.	A 1		3	0.2	
Park St.	Lincoln St.	Wood St.	A 1		6	0.4	
Wood St.	Division St.	Milwaukee Av.	A 1		6	1.5	
Ellen St.	Wood St.	Milwaukee Av.	A 1		6	0.7	
Blucher Pl.	Wood St.	Lull Pl.	A 1		3	0.2	

Street	From	To	Pavement Class	Car Tracks Class	Clean per Week	Men Days	Total
Lull Pl.	Wood St.	Ellen St.	A 1		3	0.4	
Moorman St.	Lull Pl.	Paulina St.	A 1		3	0.2	
Alley	North of Division St.	East of Wood St.	B 1		1	0.2	
Alley	Ellen St.	Wood St.	B 1		1	0.1	
Mautene Ct.	Milwaukee Av.	376′ south	A 1		6	0.3	
							6.2
Section 25							
Bauwans St.	Elk St.	Blackhawk St.	A 1		3	0.2	
Bauwans St.	Blackhawk St.	Ashland Av.	B 1		3	0.4	
Elk St.	Paulina St.	Bauwans St.	B 1		3	0.2	
Dean St.	Brigham St.	Paulina St.	A 1		3	0.3	
Brigham St.	Wood St.	Ashland Av.	A 1		6	1.5	
Julian St.	Wood St.	Ashland Av.	A 1		6	1.3	
McReynolds St.	Wood St.	Ashland Av.	A 1		6	1.5	
Blackhawk St.	Paulina St	Ashland Av.	A 1		6	0.8	
							6.2
Section 26							
Ingraham St.	Noble St.	C. & N. W. Ry.	A 1		6	0.5	
Subway	Ingraham St.	C. & N. W. Ry.	B 1		6	0.2	
Bradley St.	Noble St.	Elston Av.	B 1		6	1.1	
Subway	Bradley St.	C. & N. W. Ry.	B 1		6	0.1	
Sloan St.	Noble St.	C. & N. W. Ry.	A 1		6	0.6	
Subway	Sloan St.	C. & N. W. Ry.	B 1		6	0.1	
Bradley St.	Cleaver St.	Noble St.	A 1		6	0.3	
Cleaver St.	Blanche St.	Division St.	A 1		6	2.4	
Blackhawk St.	Noble St.	Elston Av.	A 1		6	0.8	
Luce St.	Blackhawk St.	Fox Pl.	A 1		3	0.2	
Subway	Blackhawk St.	C. & N. W. Ry.	B 1		6	0.1	
							6.4
Section 27							
Holt St.	Division St.	Blackhawk St.	A 1		6	1.4	
Blackhawk St.	Ashland Av.	Holt St.	A 1		6	0.8	
Dickson St.	Wabansia Av.	Division St.	A 1		6	3.6	
Bradley St.	Cleaver St	Holt St.	A 1		6	0.3	
							6.1
Section 28							
Blanche St.	Ashland Av.	Noble St.	B 2		6	2.1	
Noble St.	Blackhawk St.	Blanche St.	A 1		6	0.8	
Subway	Noble St.	C. & N. W. Ry.	B 1		6	0.3	
Blanche St.	Noble St.	Fleetwood St.	A 1		6	0.9	
Fleetwood St.	North Av.	Elston Av.	B 2		3	1.2	
McHenry St.	North Av.	Blanche St.	A 1		3	0.3	
Noble St.	North Av.	Blanche St.	A 1		3	0.4	
							6.0
Section 29							
Armitage Av.	Robey St.	Paulina St.	A 1	2 G1	6	3.5	
Paulina St.	Armitage Av.	Clybourn Pl.	A 1	2 G1	6	1.2	
Clybourn Pl.	Paulina St.	Wood St.	G 1	2 G1	6	1.5	

Explanation of Code Letters and Numbers.

A....Asphalt.
B....Brick.
C....Concrete.
D....Creosote Block.
F....Cedar Block.
G....Granite.
H....Macadam.
J....Asphalt and Macadam.
Subscript 1....Good Condition.
Subscript 2....Fair Condition.
Subscript 3....Poor Condition.

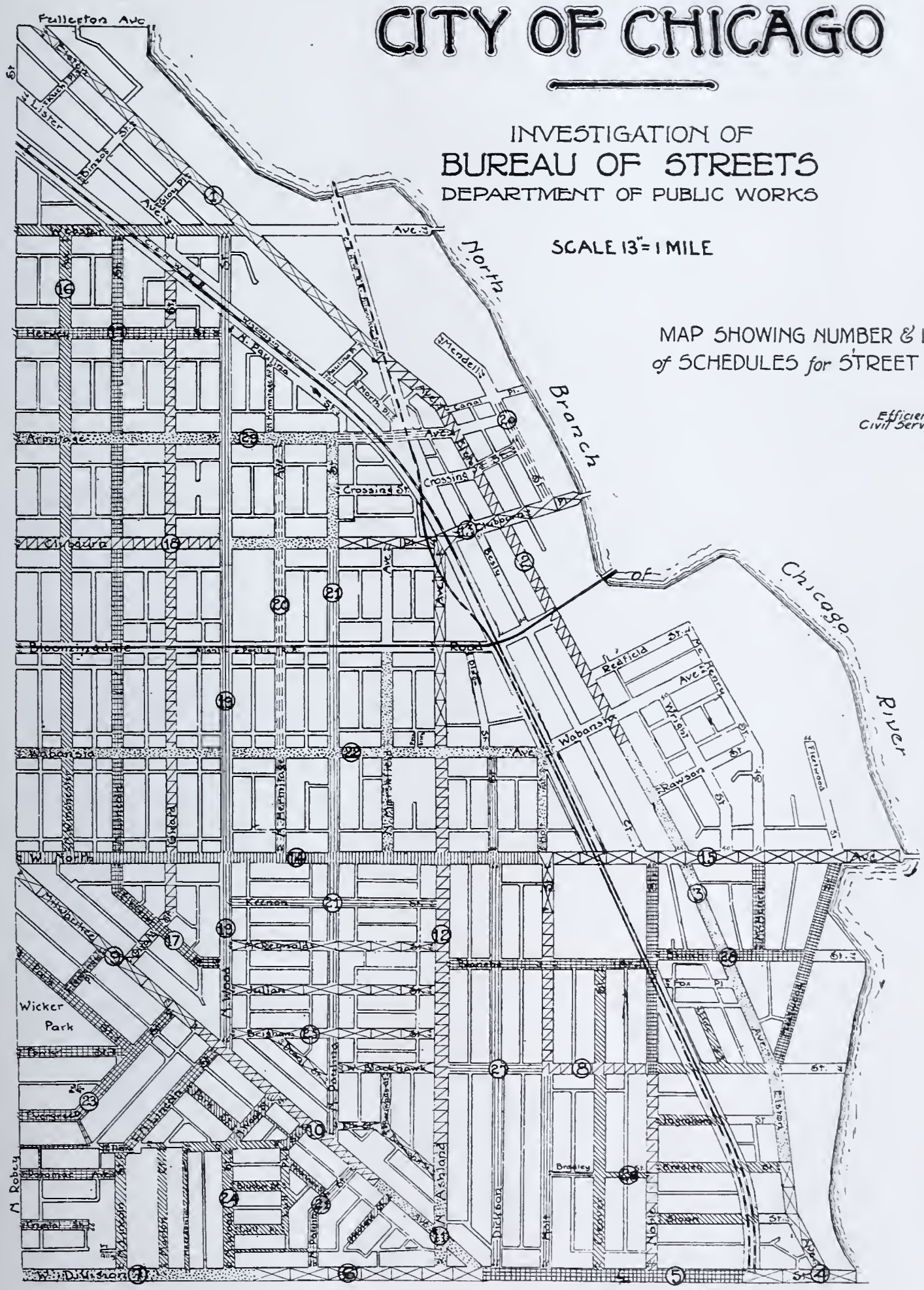
2 G....2 car tracks—Granite pavement.
1 G....1 car track —Granite pavement.
2 D....2 car tracks—Creosote Block pavement.
1 D....1 car track —Creosote Block pavement.
2 B....2 car tracks—Brick pavement.
1 B....1 car track —Brick pavement.
X....Head room, 0 to 3 minutes.
Y....Head room, 3 to 10 minutes.
Z....Head room, 10 minutes or more.

PLATE XXIX

16TH WARD
CITY OF CHICAGO

INVESTIGATION OF
BUREAU OF STREETS
DEPARTMENT OF PUBLIC WORKS

SCALE 13" = 1 MILE

MAP SHOWING NUMBER & LOCATION
of SCHEDULES for STREET CLEANING

Efficiency Division
Civil Service Commission